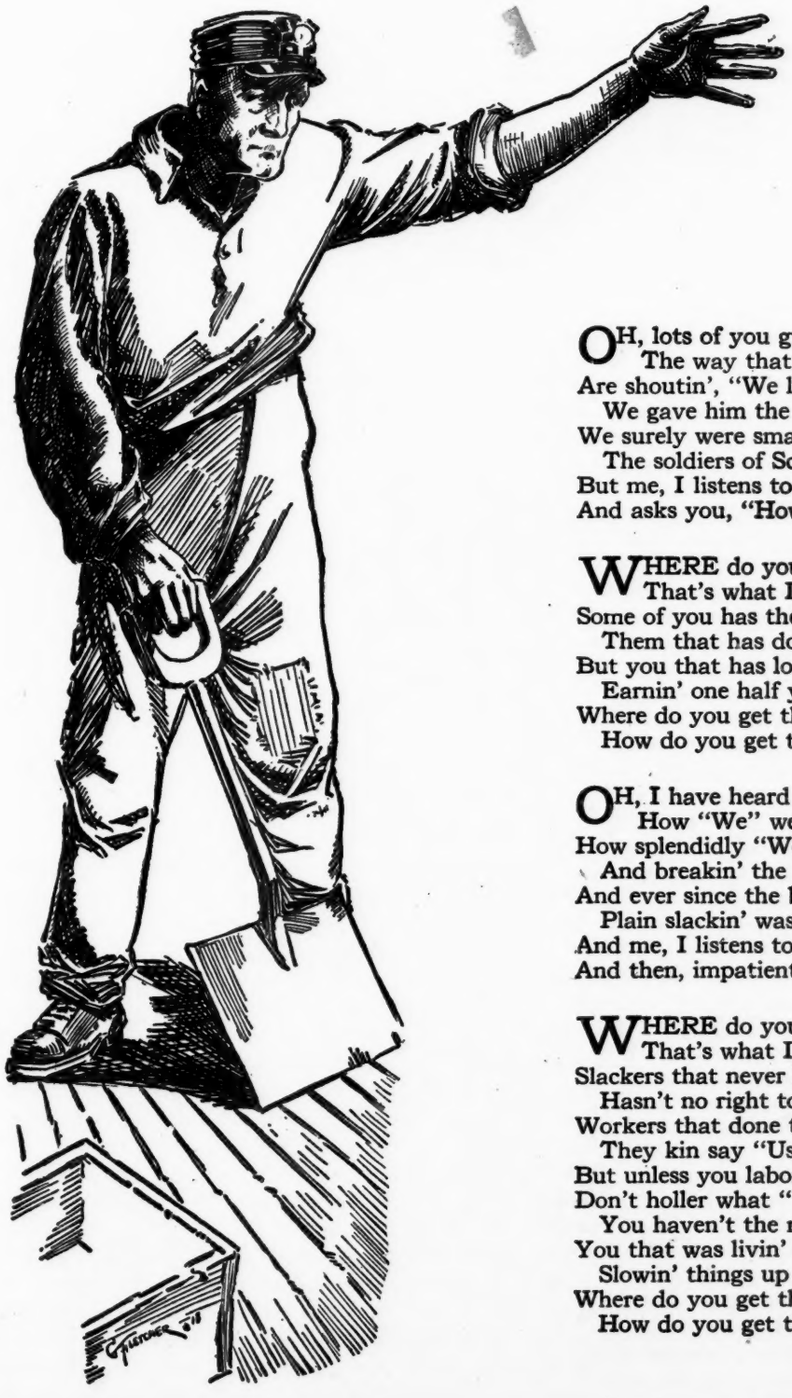
COAL AGE

Volume 15 — New York, January 2, 1919 — *Number* 1



The Question

Written expressly for *Coal Age*
By BERTON BRALEY

OH, lots of you guys discussin'
The way that our soldiers fight,
Are shoutin', "We licked the Prussian,
We gave him the gaff, all right.
We surely were smashin' an' crushin',
The soldiers of Schrecklichkeit."
But me, I listens to what you say
And asks you, "How do you get that way?"

WHERE do you get that "We" stuff?
That's what I want to ask.
Some of you has the right to talk,
Them that has done their task.
But you that has loafed and loitered,
Earnin' one half your pay,
Where do you get that "We" stuff?
How do you get that way?

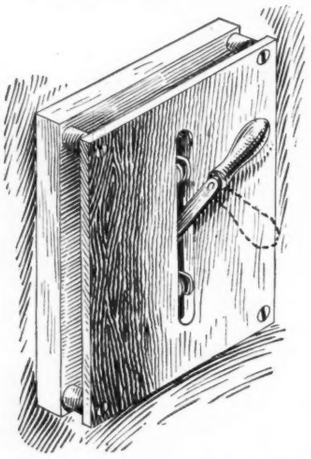
OH, I have heard fellers chinnin'
How "We" were a-pushin' through,
How splendidly "We" were winnin'
And breakin' the Boche in two.
And ever since the beginnin',
Plain slackin' was all *they'd* do.
And me, I listens to what they spout
And then, impatient, I hollers out—

WHERE do you get that "We" stuff?
That's what I want to know.
Slackers that never had done their job
Hasn't no right to blow.
Workers that done their duty,
They kin say "Us" and "We,"
But unless you labored and saved your share
Don't holler what "We" did over there,
You haven't the right, you see!
You that was livin' easy,
Slowin' things up each day,
Where do you get that "We" stuff?
How do you get that way?

IDEAS AND SUGGESTIONS

Safety Switch Shield Protects Against Electric Shock

The accompanying illustration shows a protection against electric shock, which is liable to occur to those handling knife switches located in dark places. To avoid such occurrences a board of suitable dimensions



with a slot cut in it long enough for the travel of the switch blade, is fastened to the switch plate by means of four screws passing through insulating distance pieces. The hinged handle facilitates the motion of the blade in both directions.

Construction of a Bell-Ringing Transformer for Signaling Apparatus *

BY GEORGE F. DESILVER
St. Louis, Mo.

It is now generally appreciated that in places where 110-volt alternating current is available a bell-ringing transformer makes the most satisfactory device for furnishing current for the operation of signaling apparatus such as call bells, annunciators and alarm signals. A

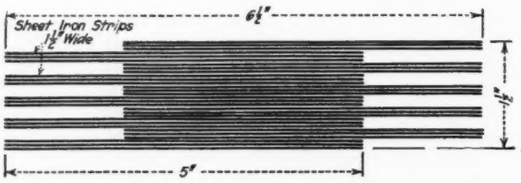
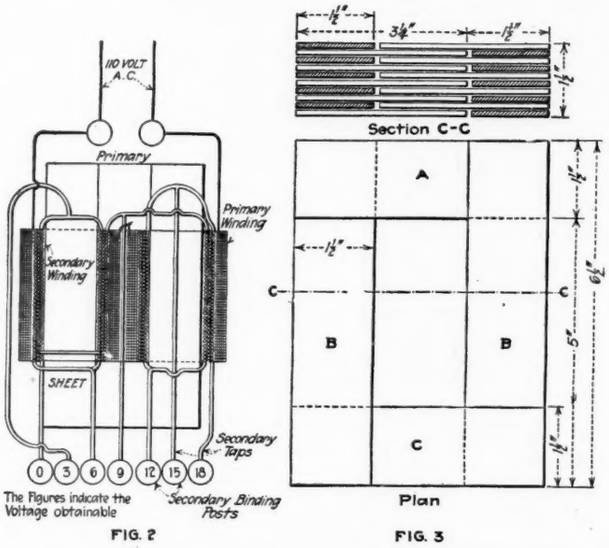


FIG. 1. METHOD OF MAKING CORE OF STRIPS

transformer which, when 110 volts is impressed on its primary will deliver either 3, 6, 9, 12, 15 or 18 volts at its secondary, can be constructed as shown in Figs. 1, 2 and 3.

The core is built up of sheet-iron strips. The softest sheet iron available should be used, and it should be as thin as it is possible to secure. To insure that the sheets will be thoroughly annealed they should be heated to a red heat and then cooled very slowly. Cut from this sheet-iron material a sufficient number of strips *A*, Fig. 3, 1½ x 3¼ in., to make a pile 3 in. thick. Also cut enough strips *B*, 1½ x 5 in., to make a pile 3 in. thick. The strips *B* should then be piled into a core in the manner illustrated in Fig. 1. After being assembled into this core, the strips should be clamped securely and wrapped with three or four layers of friction tape, so that they will be held in a compact mass.

The core should be wound as follows: On each leg, as shown in Fig. 2 for the secondary, wrap about 2½ lb. of No. 12 double cotton-covered copper wire. There



FIGS. 2 AND 3. HOW TO MAKE THE WINDINGS

should be three layers of 25 turns to the layer. This secondary is connected to the binding posts as follows, and as shown in Fig. 2. As each layer is completed a tap is carried to one of the binding posts. The wire with which the secondary winding starts is connected to post 0. From the end of the first layer a tap is carried to post 3. From the end of the next layer, a tap is carried to post 6. Taps are carried to the posts systematically in the manner suggested, and as shown in Fig. 2. The secondary winding is of course in one continuous length on each leg, and the connections to the binding posts are taps soldered thereto. The windings should be in such direction that they will correspond to those shown in Fig. 2.

The primary winding, upon which 110 volts is impressed, is wound over the secondary. It consists of about 6 lb. of No. 22 single cotton-covered copper wire. There should be about six layers with 67 turns to each layer. For insulation between the primary and secondary there should be used a stiff strong paper. Good bond writing paper will suffice. As each primary and

*Copyrighted.

secondary layer is completed it should be thoroughly soaked with shellac, so that when the winding is complete it will set into a compact mass.

After the windings on the legs are completed, the 3¼-in. strips *A* (Fig. 3) can be inserted, as shown in that illustration, between the ends of the strips *B*, to complete the magnetic circuit. To hold the *B* strips in position on the legs and to clamp the transformer to a back board, wooden straps can be utilized. These straps should be so arranged parallel to the iron strips *A* that they will bind the whole transformer down against a wooden base block. Small machine bolts are inserted in the wood straps to effect the clamping action necessary.

Cautions To Be Observed When Testing Dry Cells

In testing dry cells, small-diameter wires should not be used for the ammeter leads. These conductors should be not more than 12 in. long and of a cross-sectional area equivalent to at least that of No. 12 wire.

The ammeter leads should not be held on the binding post of the cell under test for more than 2 or 3 sec. at a time. An ammeter connected directly across the terminals constitutes an almost "dead short-circuit" and will therefore quickly "exhaust" and spoil the cell. Always hold the ammeter lead terminals on the brass binding posts of the cell; it is not good practice to hold the end of one ammeter lead on the upper end of the carbon and the other on the edge of the zinc casing.

Finally, be certain that the ammeter or battery tester which you are using is correct. The value of your test depends wholly on the accuracy of the testing instrument. Hence, the ammeter should be compared often with a standard instrument which is known to be absolutely accurate.

Electric Signal System That Eliminated Collision Troubles

By Orin Kelly
Columbus, Ohio

The accompanying illustrations show a signal system designed by myself for one of the large mines in Ohio where considerable trouble was occasioned by collisions

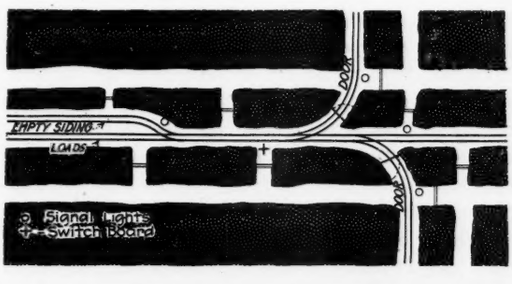
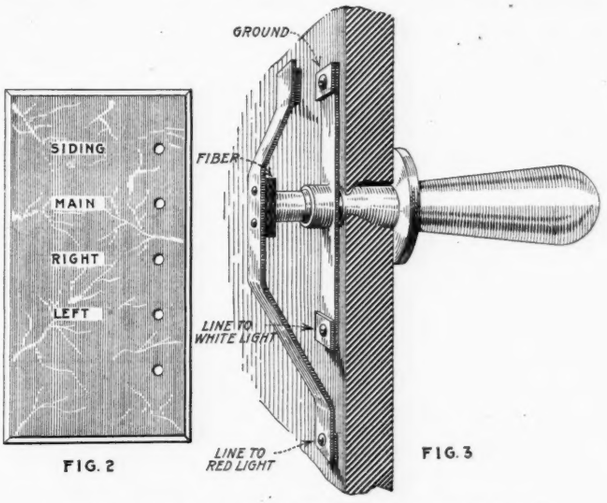


FIG. 1. SHOWING POSITION OF SIGNAL BOXES

between haulage locomotives. These took place at a point where three motors gathered the coal to a common siding by an arrangement of switches, as shown in Fig. 1.

Doors were provided at the entrances to the right and left entries, and a boy was stationed here to attend to them and to flag for the motors. It was found, however, that a better system was needed, and that shown in the sketches was designed.

Four wooden boxes were made, each provided with two electric lamps, one red and the other white. The boxes were painted white inside and had wire netting over the front to protect the lamps. These signal boxes were placed at the points marked by circles in Fig. 1, these points being such as to give the motorman a clear view of the signal in time to stop his trip before passing the signal box. The motormen were instructed not

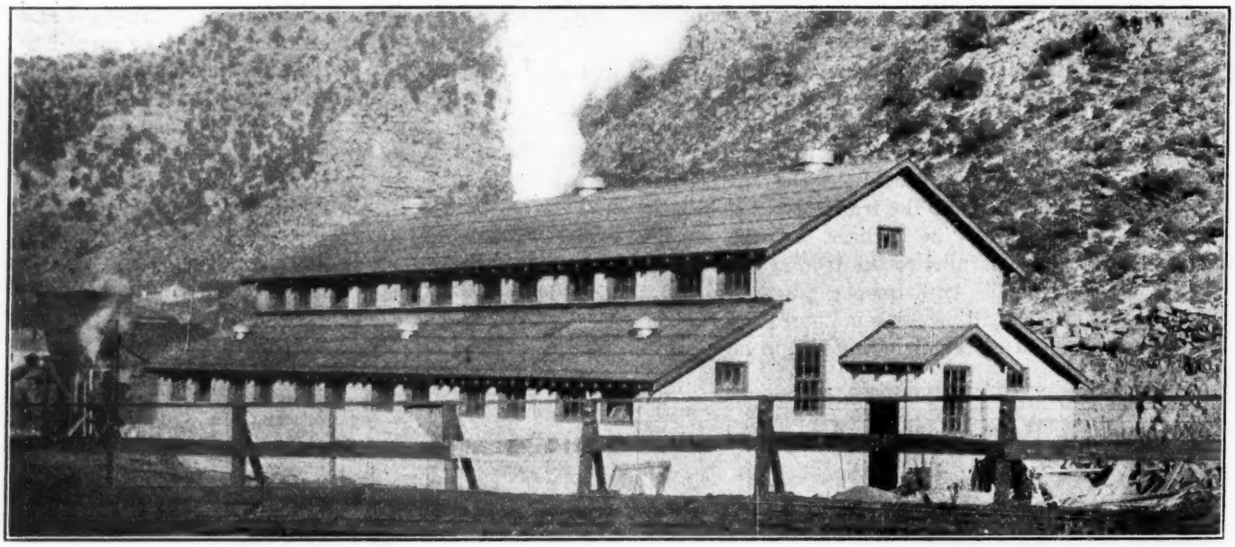


FIGS. 2 AND 3. CONSTRUCTION DETAILS OF SWITCHBOARD

to pass any signal station unless the signal light then burning was white. These signals are operated by the trapper from a switchboard placed at the point marked with a cross.

Figs. 2 and 3 show the construction of the switchboard. The circuit to the red light is kept closed by a spring contact until it is opened by the insertion of the switch plug which, while it opens the circuit to the red lamp, closes that to the white. As only one switch plug is furnished it is impossible to give a clear signal at more than one place at one time, all others showing red. It will be seen that each motorman moves through this common meeting point only on positive signal, and when this shows clear. No other motor can get through without running by a red block, in which case the position of the signals fixes the blame at once and without question.

In order that the men engaged in rescue work at a mine following an explosion or accident may render most efficient service they must have a comfortable place for rest and sleep. While men are sleeping they should not be disturbed by those who are off duty and awaiting their shift. Hence sleeping quarters should be provided to accommodate half of the total number of men employed in rescue and recovery operations, as at no time will more than half the men be off duty. The rest room should be separate and apart from the sleeping quarters so that men who are sleeping will not be disturbed.—*Rescue and Recovery Operations in Mines.*



Mine Bathhouses in Utah

By A. C. WATTS
Salt Lake City, Utah

SYNOPSIS—*Bathing facilities at mines were formerly decidedly crude and inadequate. In a mountainous country many considerations besides the water supply and necessary heating arrangements enter into the design of a bathhouse. These have been solved with a fair degree of satisfaction, and many miners now refuse to work at a mine that has no washhouse.*

MANY years ago, after coming out of a coal mine for the first time in my life, I solemnly vowed never to go into another. It was not because of being afraid of the dark, or of the many dangers present in all coal mines; for there were many lights, and there was also an entire lack of knowledge of the dangers. But the resolution was due to the dirt which soiled everything and the black hands and faces and sooty nostrils of all the workmen.

We were a party of students, members of the graduating class of a famous Western mining school, and we were making an inspection trip. With us was our professor of metallurgy, who, because of a cherished beard of fiery hue, was called "Pink Whiskers." On our way out we passed through a door which was guarded by a vicious trapper, sporting an enormous oil lamp on which had accumulated a luxurious growth of oil and soot. Seeing a bunch of greenhorns coming, he carefully anointed his hands from his lamp and then proceeded to wipe them on the faces of the unwary students, not omitting "Pink Whiskers," whose pride and dignity were much hurt thereby. A poor trapper boy is not supposed to know a learned professor on sight anyway. It made a great impression on one young mind, more particularly because there was no means of getting clean until we had reached our hotels at night.

A short time after, through one of the ironies of fate, I found myself earning (or trying to earn) my living as a surveyor in that same coal mine and others operated by the same company. Then was acquaintance begun with miners' bathhouses. The remembrance of those rough board sheds, drafty, generally dirty and lighted by small oil lamps or often by the smoky pit lamps carried by the miners, is still vivid.

The water was heated on an old kitchen stove that also served to heat the building, and we bathed in round washtubs, standing up in them and using strong laundry soap. We had to commence with the top of our heads, and the strong lye soap suds from the shampoo would get into our eyes and blind us. By the time our knees were reached, the water was some dirty. Our backs generally remained shady unless some kind buddy lent a helping hand, and then he often took advantage of our innocence and used a broom or scrubbing brush. When bathing was finished, we dumped the water through a wooden trough out onto the ground and let the next man have our tub. If he was fastidious, he rinsed it out with hot water before bathing—but each man for himself. After getting out of the tub, one would get his feet all dirty again on the floor.

Looking back on it all, it does not appear strange that some miners feared the ordeal of washing their back and legs above the knees, because of the belief that it made them weak.

There were unauthenticated rumors of metal mines somewhere in the state that had steam-heated washhouses with porcelain bathtubs, lockers, etc., but though we longed for them, never a one did we see. When the time came that partly through demands of the men and partly because of the desire of operators to make working and living conditions for the men and their families as attractive and hygienic as possible, we were called upon to design and erect bathhouses, the task was undertaken with considerable appreciation of what it would mean to the employees.

Unfortunately, plans and descriptions of bathhouses were few and meager. There had appeared in the col-

umns of *Coal Age* from time to time descriptions of the elaborate bathhouses in France, Germany and Belgium, and one or two American installations. The cost of structures as built in European countries would be prohibitive in the mountain states, but by way of comparison a table was made up showing the main features (see Table I). The Utah Fuel Co. adopted a standard design for its main bathhouses, and in 1917 built three of them at an average cost per man of about $33.

There are many conditions to be met in the design of such structures. The location is the first question to be solved, for upon it depends many features of design. In the mountains space for buildings is often quite limited, and as it is essential to have the bathhouses close to the mine mouths, both because of convenience and to protect men in cold weather when they come out of the warm mines, the shape of the building must be made to conform to the topography of the country.

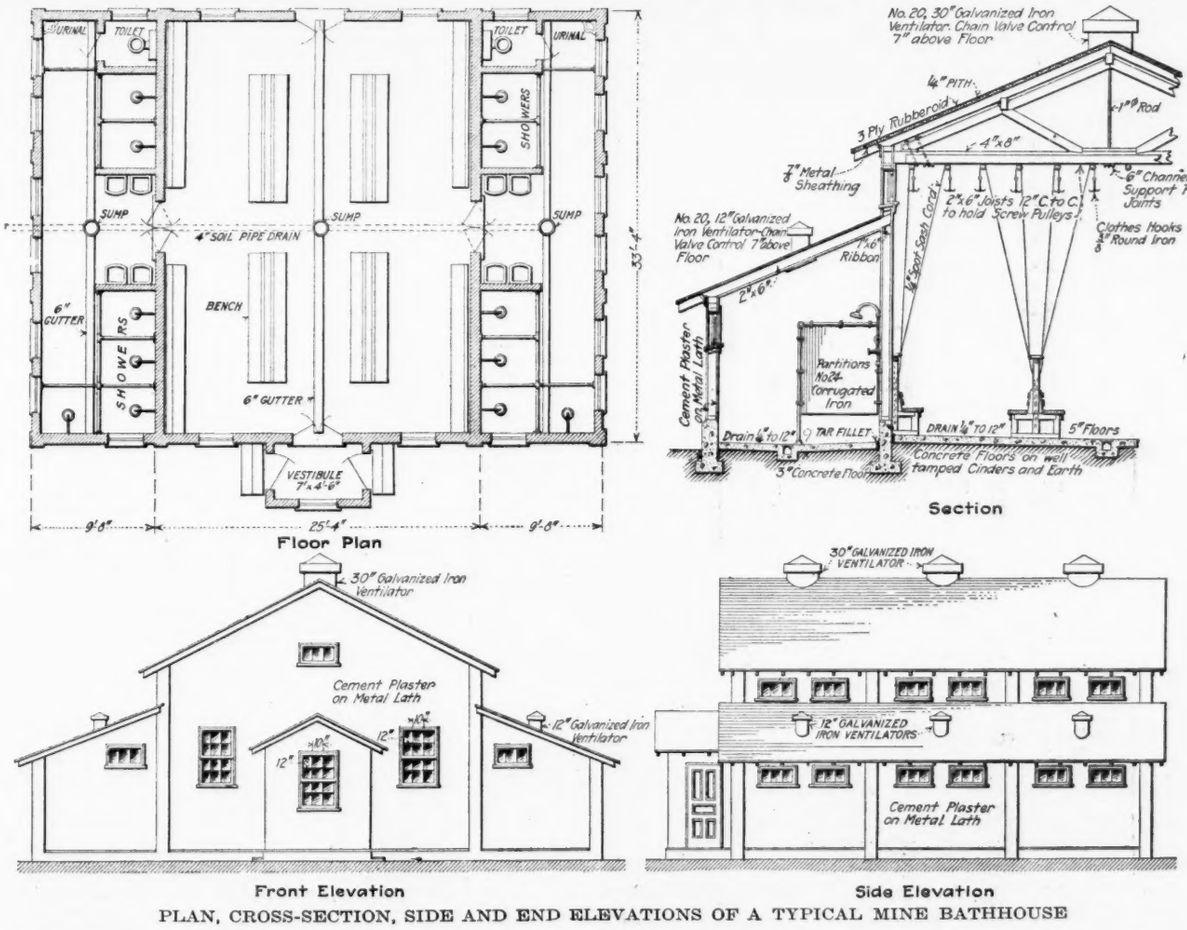
Usually the building must be long and comparatively narrow. In the design adopted, 45 ft. was about as wide as ground space in canyons usually permits. The building should either be located near the lamp- and checkhouses, or be combined with them. By so doing it is often possible to effect saving in attention.

The powder distributing magazine should also be located at a convenient distance from the bathhouse. Furthermore, the landing or stopping stations for man trips must be considered when deciding on a location. Fortunate indeed is the mine at which all these considerations can be satisfactorily taken care of and still have the bathhouse close enough to the power house to be supplied with steam heat and hot water without long, wasteful pipe lines.

Being thus of necessity close to the mine mouth, the building must be practically fireproof. With common brick at $25 per M., cement at $4 to $4.50 per barrel, sand $3 per yard, steel almost worth its weight in gold and wages from $6 to $8 per 8-hour day, it takes some figuring to prevent the costs running up. The design adopted was a wood frame building covered on the sides with expanded metal lathing and cement mortar, the outside wall being back-plastered. This gives an air space which aids in the heating and prevents condensation of moisture.

One of the buildings was given a pebble-dash surfacing on the outside, using fine coke breeze for pebbles. The result was a light grayish green color very pleasing to the eye. Exposed woodwork was painted brown. The other two buildings were smooth-finished. With such finish, shrinkage cracks can be easily treated. The inside walls were smooth-finish, and after thorough drying were given a rich cement wash to fill all hair cracks and render walls more nearly impervious to water. Renovation can readily be accomplished by use of suitable cold-water paints.

For roofing, galvanized corrugated iron, or some kind of asbestos prepared roofing, laid on ship lap, makes a suitable cover. Exposed iron roofing invites condensation with consequent drippings. The buildings were designed on the unit basis, so that if expansion is desired, a panel at a time can be added without undue expense and without change of plans or symmetry.



PLAN, CROSS-SECTION, SIDE AND END ELEVATIONS OF A TYPICAL MINE BATHHOUSE

Not only must the size be kept down to conform to and conserve available ground space, but the cost must be thoroughly considered; and as such buildings are essentially one-story structures, the larger the ground space the greater the cost. For this reason hangers for clothes were adopted instead of the locker system. Of great importance, also, is the sanitary question. Lockers permit the spread of vermin and disease, and Pulley hangers and ropes with means of fastening to the benches were furnished by the company, but the men are required to furnish their own locks, towels and soap. With hangers, the danger of fires is obviated to a considerable extent.

Ventilation must be carefully considered, for it must be adequate, yet without drafts. With this in mind the windows were placed high; chimney ventilators were

TABLE I. MINERS' WASHHOUSES—27 EUROPEAN MINES AND 1 AMERICAN

Colliery Location	Men Employed	Men Bathing	Per Cent. of Employees	Bath Equipment: Spray	Bath Equipment: Tubs	Bath Equipment: Basins	Change Equipment: Lockers	Change Equipment: Chain and Hook	Men per Spray	Cost per Man	Size, Description, Etc.
Bois du Lac, Belgium	420	420	100	80	..	..	...	800	10	$19.50	Men use approximately 8 gal. water per bath. Time per man approximately 10 min. Temperature of water 95 to 100 deg. F. Bathroom floors of cement, tile or asphalt. Bath partitions corrugated iron, sheet iron, porcelain, marble, etc.
Belgium	500	250	50	22	..	..	...	500	10	*8.20	* Figures for 500 men, but only 250 use baths.
Belgium	507	330	65	23	3	..	...	600	16	11.70	Costs per bath range from ½c. to 1c. Many baths installed before compulsory law.
Belgium	334	167	50	24	4	..	384	....	20	9.10	Four buildings, one men, one women, one engineers, one superintendents.
Belgium	400	280	70	24	..	..	10	400	17	29.00	Separate buildings for bath and dressing rooms.
Belgium	600	425	71	50	3	..	...	600	12	17.00	In general, bathrooms are quite private, with showers, partly partitioned off from small dressing room, though most of dressing is done in clothes rooms.
Belgium	613	416	68	49	4	..	208	470	14	8.40	
Belgium	449	449	100	42	2	6	23	560	10	19.10	Apartments for men and women.
Belgium	440	440	100	36	8	8	...	524	15	*21.40	* Three separate buildings—one men, one women, one superintendents. Includes laundry and meals, accommodation.
Leeds, England	....	....	..	50	6	..	200	200	....	.....	Peculiar zig-zag arrangement of showers saves floor space. Small dressing rooms opposite each shower (*Coal Age*, 2-10-12).
Belgium and France	800	800	100	124	4	..	...	800	7	.....	Dressing room 130x40x24 ft. high; only eight double benches in dressing room. Each bath compartment is divided into the shower room and a small dressing room. Shower walls enamel brick.
	1735	1215	70	146	..	..	...	1905	13	10.70	*Coal Age* gives average cost $124.58 per bath. 10.22 per man.
	620	395	64	40	..	..	...	400	13	14.60	Maintenance 1.22 each bath per mo. .005 one bath
	575	525	91	38	..	..	...	400	10+	12.30	Capital costs vary from $9.73 to $17 per man.
	700	490	70	40	..	..	...	500	12+	13.80	$17 will erect quite an elaborate bathhouse
	760	525	70	50	..	..	...	550	11	11.05	German installations cost $19.46 per man.
	980	800	82	105	..	..	...	1200	11+	11.03	Men are required to bring a change of clothing once a week under penalty.
	700	450	65	44	..	..	...	....	10+	*19.80	
	494	293	60	22	..	..	...	400	18	10.70	
	502	310	62	22	..	..	...	400	18	12.20	
	1030	950	92	60	..	..	...	1000	17−	9.73	
	804	200	25	36	..	..	...	500	14	6.60	
	360	270	75	36	..	..	...	300	8+	7.80	
	310	217	70	33	..	..	...	....	10	*22.20	* Figures for 310 men.
Rheims, Preussen Germany	4000 3 shifts	985 1 shift	..	144	..	..	...	4000	7	.....	Building 180x84-ft., aisles 12-ft. wide; 4,000 men three shifts; 985 maximum one shift. Men wash and dress in 15 to 20 min. Men under showers about 10 min. Steam heated to about 85 deg. F.
Quesnay, Belgium	....	500	..	80	..	..	...	800	10	20.00	Two buildings, bath 69x46x23 ft. One dressing hall 75x46x41 ft. high. Hangers arranged along walls. Twelve benches in dressing room. Cost $15,959; $20 per hanger or per man. Dressing room will accommodate 1,000 hangers.
Calais	650 2 shifts	....	..	56	..	..	...	650	6	.....	
Clinton, Ind.	200	150	75	15	..	20	...	....	13	.....	Building 31 ft., 8 in. by 62 ft., 8 in. concrete and steel. Designed by Roberts & Schaefer. Vent—Monitor sash. Showers and clothes hooks in same room. Showers 4-ft. centers. Urinal 8-ft. long. Benches 8-ft. centers. (*Coal Age*, 1-18-13.)
Totals, Average	....	....	..	..	..	..	...	....	329 12	$325.91 14.17	

QUESNAY PIT, BELGIUM

Two Buildings—Dressing Room 75x46x41 ft; Bathroom 69x46x23 ft.

	Dressing Hall	Bath-room	Total	Per Man
Grounds	$357.00	$357.00	$714.00	$0.89+
Buildings	5,200.00	5,120.00	10,320.00	12.90
Fittings	1,415.00	3,510.00	4,925.00	6.15+
Total	$6,972.00	$8,987.00	$15,959.00	$19.94

give an unpleasant odor to the dressing room, whereas by suspending clothes near the ventilators in the roof, odor is eliminated and opportunity is given to thoroughly dry and air them. If sufficient space is allowed between hangers there is no danger from spread of vermin. It was found that at least 30 in. should be allowed between hangers, and rows should be staggered.

Steam heating was employed, the pipes being placed where possible overhead and away from casual contact by men. It is also desirable to place guards around

put on the peak of the roof, with valves for opening and closing them. Vestibuled entrances with side doors and swinging doors, giving entrance to the main building, were adopted.

THIS MINE WASHROOM CONTAINS MANY FACILITIES FOR A GOOD SCRUB

Typical Views Inside One of the Modern Bathhouses Erected by the Utah Fuel Co. for the Use of Its Employees

CHANGEROOM IN THE BATHHOUSE—NOTE THE HOOKS FOR CLOTHES

pipes and radiators to prevent the men from being burned. There need be little hesitation over a decision as to whether tubs or showers should be adopted, for apparently the arguments of sanitation, economy of time and water are all in favor of showers.

The heating of the water was done by live steam with pressure regulated to suit the water pressure. The water is heated at the showers by special mixers which are so made that it is impossible to scald by steam. There are several good mixers on the market. When the pressure of steam for room heating is different than the pressure required for water heating, two steam lines must be used, each equipped with pressure regulators. To prevent waste of steam in the heating plant, steam traps must be provided or a return system to the boilers used. When economy of water is a requisite steam mix showers cannot always be used, but water must be heated by special heaters and showers equipped with automatic closing valves. These, however, are inconvenient because but one hand can be used in bathing and the water temperature is not easily regulated.

The floors in the change- and washrooms are of concrete. The foundation walls for the sides of the building and partitions are concrete for about 2 ft. above the floor. All floors drain to a central trench covered by wood gratings, and the drainage is properly trapped and led to cesspools or septic tanks. It may be desirable to place grease traps in these drains in some instances. Hose connections are provided at several places so that all floors, walls and benches can be easily and thoroughly washed. Using hangers for clothes instead of lockers makes this cleansing easier and more thorough.

Ample Room for Change of Clothes

The changeroom must be designed so as to allow ample room for dressing and for the passage of men into and out of the bathrooms and building. With this in view, the bathrooms were placed on each side of the changeroom with swinging doors in the middle of the partition. An aisle between ends of benches was left opposite these doors.

As shown in the plans, the washrooms are built all along the sides and are equipped with showers, washbowls, urinals and closets (the latter inclosed). The ventilation for these washrooms was kept separate from the main building, and efforts were made to keep the moist air in them from entering the changerooms. The entire building should have plenty of natural light. Light, cleanliness and health form a trinity indispensable to efficiency and happiness. The windows should be placed as high as possible. In the plans shown the windows in the washroom are hinged at the bottom.

The first design contemplated partitions between showers, but these were not put in as it was decided it was more convenient and efficient without them. Experience, as shown by compiled statistics, indicates that one shower per 12 men is sufficient. It is well to have plenty of space in the washroom, so that men may dry themselves and walk to the changeroom without being again wet from the showers. This can be accomplished by a partition when space is at a premium, or by inclosing the showers or by giving ample width to the room.

A charge of 50c. per man per month is made for the use of the bathhouse. This is hardly sufficient to pay the janitor's wages, let alone amortization, maintenance, interest, taxes, insurance, water, heat and light, but the company considers it a good investment if it lends to the health and happiness of the community.

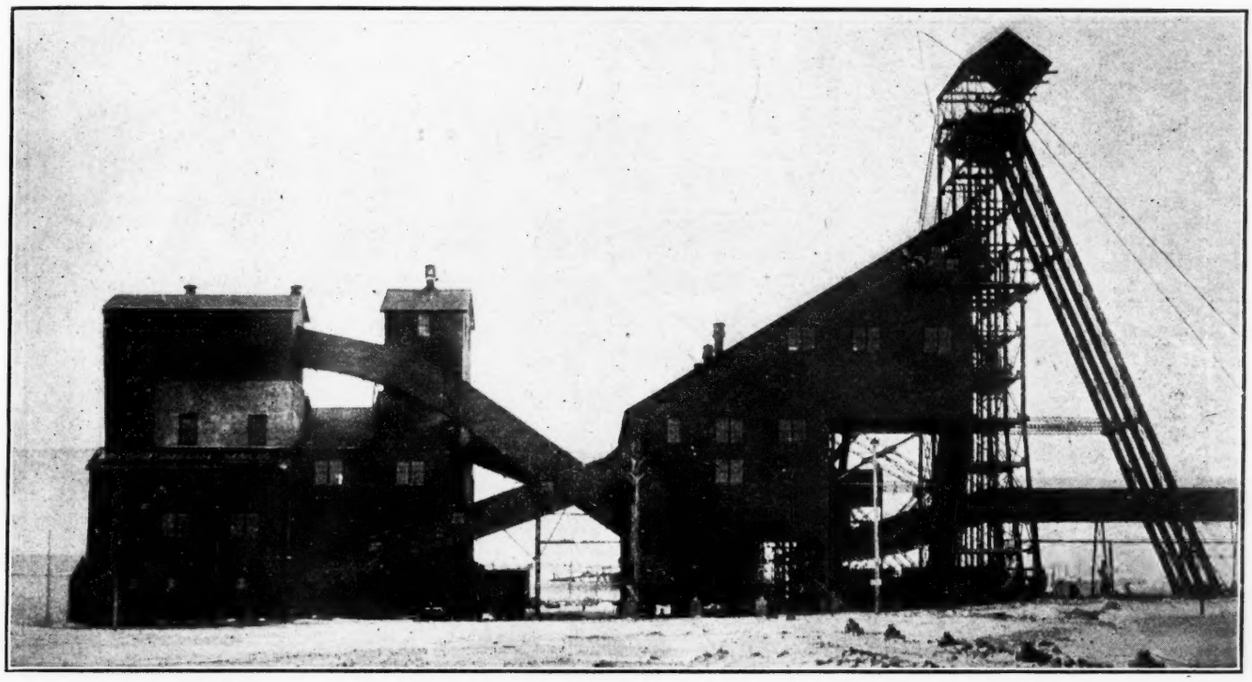
How do the men take to the bathhouses, do you ask? Well, you know how a gang of kids act when they go down to the swimming hole for the first time in the spring. They all stand around waiting until some boy takes the first dive, and coming up to the surface, yells, "Comonin youse fellers, the water's fine." Then the rest all make haste to follow suit. So with our miners; they were a little backward at first, but now they often refuse to work in a mine which has no bathhouse, and applications have been received from outsiders for privilege to use them. The company now has bathing facilities at all its mines, and these will be enlarged as the demands grow.

Psychology of Efficiency and Fatigue

The director of the psychological laboratory at Cambridge University, England—Dr. Charles S. Meyers—is the author of a little book reecntly published entitled "Present Day Applications of Psychology." In commenting on this book, *The Colliery Guardian* states that of late years much attention has been given to the analysis of the factors governing industrial efficiency, as measured by muscular and mental work. By means of the ergograph, a muscular work curve can be obtained and certain principles regarding fatigue and recovery have thus been established.

The author illustrates the application of these principles by examining the case of 500 shovelers, employed in moving coal. Experiment soon proved that efficiency depended upon the use of a shovel weighing with its load about 21 lb. Thus, by adjusting the weight of the shovel to the material shoveled, the following astonishing results were obtained: (1) The average amount shoveled per day rose by nearly 270 per cent., or from 16 to 59 tons per man. (2) One hundred and fifty men could now perform what 500 men had previously accomplished. (3) The average earnings of the shovelers increased by 60 per cent. (4) The cost to the management was reduced by 50 per cent. (5) There was no evidence of increased fatigue of the men.

Dr. Meyers also examined the relation between the work curve and the curve of frequency of accidents; this question has often arisen in connection with the discussion of colliery accidents, and no marked periodicity has in this case been established. The statement is made, however, that in certain accident curves the number of accidents increases inversely as the output. The influence of rest periods, also, is somewhat complex and experiment seems to point to the fact that for every kind of work there is a most favorable rest period—that is, a pause in which the various factors so operate as to produce a maximum amount of work after the pause. Long unbroken spells of work are economically unsound, and systematic rest pauses lead to a great improvement in the quantity and quality of the work produced.



Coal Tipple and Washery at Lehigh, Mont.

By E. P. STEWART
Chicago, Ill.

SYNOPSIS — *The apparatus here described is designed to thoroughly clean and prepare locomotive fuel. A unique feature is the provision of efficient drying equipment, so that the washed coal may be shipped in open cars without danger of freezing.*

THE Cottonwood Coal Co. has a large coal property in Fergus County, Montana. The Lehigh Shaft No. 1, at which point the plant to be described was built, is located in the westerly end of the Judith Basin. While the field is extensive, the coal obtainable contains many impurities, such as slate, heavy bone and sulphur. Fully aware of this, the Cottonwood Coal Co., when it decided to open this field, determined to provide thorough and efficient facilities for cleaning the coal so that the best locomotive fuel possible might be produced, as the entire output is taken by the Great Northern Ry. Design and construction of the plant were accordingly intrusted to the Roberts & Schaefer Co., of Chicago.

The plant and process herein described were adopted in order to secure a coal as free from impurities as possible, and of a maximum size of 5 in.—suitable for hand-firing in locomotives.

The mine cars, at the shaft bottom, are delivered automatically to the self-dumping cages. The track grades on entering the shaft bottom are such that the loaded cars run by gravity into the caging device, which permits of only one car at a time being delivered to the cages. This dispenses with labor, delay and annoyance caused by a car getting in the sump when a car or a trip accidentally becomes uncontrollable.

The handling of the mine-run coal, preparatory to treatment of the various sizes, is accomplished as follows: The coal, after being weighed in the mine, is hoisted to the top of the tipple by means of four self-dumping cages. The pit cars discharge into a large steel hopper, from which coal is fed out uniformly by means of apron feeders onto two duplicate sets of shaker screens. The coal is accurately sized on these screens into lump over 5-in. perforations, egg through 5-in. and over 2½-in. perforations, and screenings passing through 2½-in. perforations. The lump coal is delivered to a picking table, as is also the egg size, while the screenings are deflected to the coal washery for treatment.

A method of coal handling was decided upon whereby the larger sizes in the mine-run are thoroughly picked by hand, and all rock and heavy bone eliminated as nearly as possible. The finer sizes or screenings are washed in a coal washery. All sizes after they are cleaned, dried and properly treated are finally collected in a shipping bin and transported to the various coaling stations on the line of the Great Northern Railway.

The plant is designed for a maximum, eventual output of 3500 tons per day. The present mine output is between 1000 and 1200 tons daily. Rock and bone rejected approximates 12 per cent. of the mine output. The Lehigh plant is of considerable general interest through its features for efficiently removing rock and bone from coarse as well as the finer sizes; its ample and well arranged facilities for accomplishing these results by human and mechanical means, and particularly for its facilities for thoroughly drying the finer sizes, thus removing entirely any tendency of coal to freeze in railroad cars during severe winter weather with consequent loss of time and embarrassment to railroad op-

VIEW OF THE PICKERS AT WORK IN THE WELL-LIGHTED TIPPLE BUILLDING

eration. Special precautions also had to be observed in properly housing the plant and equipment to secure the comfort and protection of the operatives.

The slack coal coming from the screens is approximately 45 per cent. of the mine output. The mine shaft is 208 ft. deep from ground surface to bottom of coal, and has five compartments—four for cages and one for pipes. A lengthy description of this shaft will not be entered into here, as the subject was covered by J. W. Powell in his article in *Coal Age* for Mar. 11, 1916. The total hoist is approximately 280 feet.

Hand-picking of the lump and egg is accomplished in a large, comfortable, well lighted room in the tipple structure. All rock picked out is deposited in chutes which lead to a large rock-and-refuse bin in the tipple below the picking-room floor. Bone coal, as picked, is deposited in similar chutes which lead to a conveyor that transports this material to a crusher. The crusher reduces the bone to a maximum size of 2½ in. and delivers the crushed material to the same equipment that conveys the screenings to the washer. It will thus be seen that the washer not only handles and cleans the screenings, but recovers combustible material as well from the bone picked from the tables. The picked egg coal is delivered by the table to a conveyor leading to the final shipping bin. The lump coal is also delivered to this conveyor, but is first crushed to a maximum size of 5 in. by a Jeffrey single-roll crusher.

The tipple is equipped with local trade facilities so that miners and the townspeople may always have a supply of cleaned coal available. This coal, when required, is conveyed from either lump or egg picking table to a bin in the tipple, from which it is drawn out into wagons.

The operation of the coal washer proper is as follows: The screenings, together with the crushed bone, is conveyed to a large storage bin in the plant, from which it is fed out uniformly by means of reciprocating feeders into three Stewart jigs. These jigs remove the slate, rock and heavy bone and deliver the clean, washed product directly to the screening and drying apparatus. The refuse or reject material is elevated and either discharged into a refuse conveyor leading to the rock bin in the tipple above referred to, or into an Elmore type of rewashing jig. When this latter jig is employed, the recovered bone from the refuse is delivered into the stream of washed coal and water from the Stewart jigs and the final refuse into the conveyor leading to the rock bin in the tipple.

The jigs and washing apparatus are contained in a well lighted and comfortable room set aside in the plant for the purpose, and all equipment is readily accessible and adjustable.

Economical Water-Circulating System

The water-circulating system is that commonly employed in Stewart-type washers and is quite economical in fresh-water requirements. The circulation of the main volume of water is continuous. The water overflows the jigs with the washed coal into a sluice leading to a settling tank. The water in turn overflows the settling tank into a pump tank, from which it is pumped at the rate of 3000 gal. per minute into a supply tank immediately in rear of the jigs. Water flows from this latter tank periodically into the jigs and jig tanks and thence, as first described, into the washed coal sluice with the clean coal. The only fresh water required to renew loss is that actually absorbed by the washed coal and refuse in the washing process.

The method employed in drying the coal and preparing it for shipment is unique. It is desirable that washed coal be freed entirely from surplus moisture at all times and that in the severe winter weather it be thoroughly dried to prevent freezing. The process adopted is as follows: Washed coal and water flows from the jigs first to a revolving screen with a jacket having ¾-in. perforations. The fine coal, together with the water from this screen, is sluiced to a large settling tank wherein the coal has an opportunity to settle. It

is then elevated from this tank and delivered to a centrifugal dryer. This machine operates at a high speed, and the coal is freed entirely of surplus moisture by centrifugal force. This dried coal, together with the oversize or pea coal from the revolving screen, is collected in a suitable hopper and elevated to the shipping bin. At the top of the shipping bin chutes are so arranged that crushed lump, egg and washed screenings are thoroughly mixed in the original proportions as mined, minus the rock and bone which have been rejected by the cleaning process. This assures a superior railroad fuel and for most months of the year a sufficiently dry product.

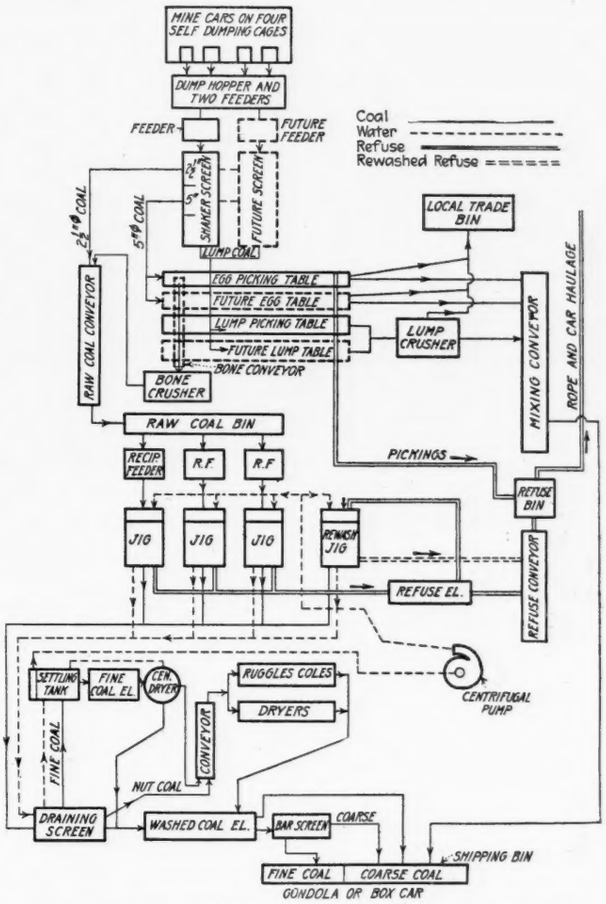
In extreme weather the pea size from the revolving screen, together with coal from the centrifugal dryer, is collected in a conveyor and delivered to two large Ruggles-Coles furnace dryers. These machines through the proper employment of heat thoroughly dry the coal and return it to the plant even dryer than that originally mined. After leaving the Ruggles-Coles dryers the coal is delivered to the elevator described above, and elevated to the shipping bin. It will be noted that use of the Ruggles-Coles drying system is entirely optional, depending wholly on weather and shipping conditions.

The washed coal is all ordinarily mixed with the cleaned egg and crushed lump, but at times it is desirable to ship some washed slack. A large bin adjacent to the shipping bin was built to contain this slack, which is obtained by discharging washed coal over a bar screen located above the bin.

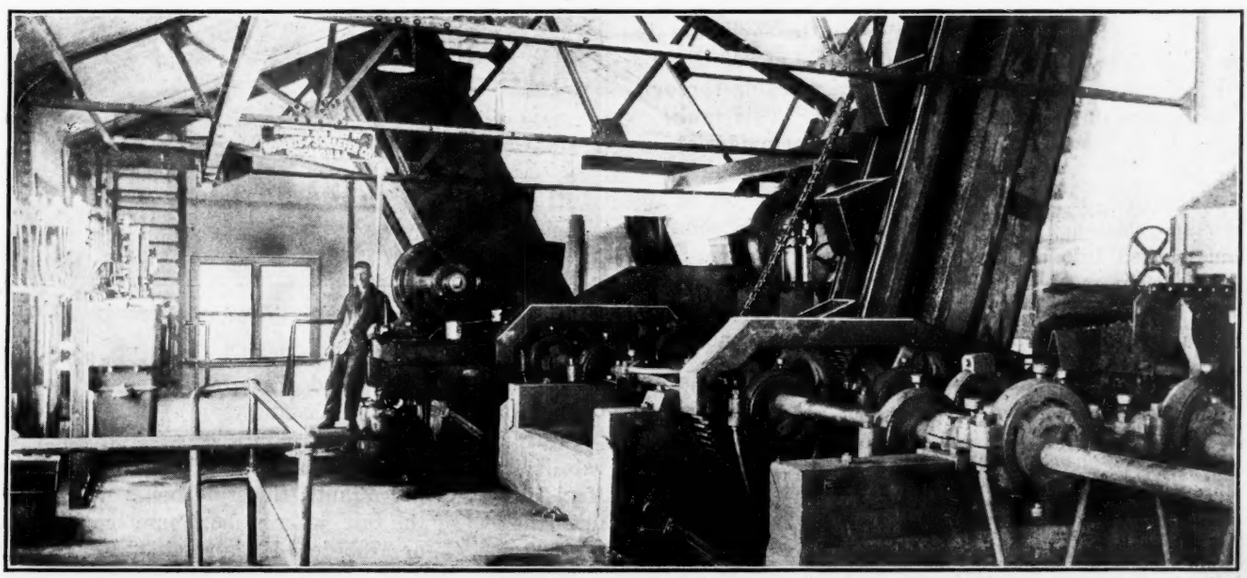
The cleaned product is ordinarily loaded out from the shipping bin into gondola cars, but a box-car loader is installed which permits occasional loading of box cars.

As previously mentioned, rock as picked from the tables in the tipple is discharged through chutes into a rock bin. This bin also receives the refuse material such as rock, heavy bone and sulphur rejected by the washer. This waste product is all deposited in a large valley about a quarter of a mile from the plant. A rope haulage and large car transports the refuse to the edge of the valley, from which point the material is distributed by an aërial tramway system.

It will be noticed from the illustrations that the entire plant is fireproof and of permanent construction. All tanks and equipment supports are concrete and all other structures of steel. Housing consists of corrugated metal on outside and asbestos mill board on the inside surfaces. All equipment is electrically operated and all units of the plant are carefully arranged with a view to economy in design and easy accessibility.



FLOW SHEET, SHOWING OPERATION OF WASHERY



PART VIEW OF THE INTERIOR OF THE WASHERY BUILDING, SHOWING CONVEYING MACHINERY

Fusibility of West Virginia Coal Ash*

By WALTER A. SELVIG
Chemical Laboratory, U. S. Bureau of Mines, Pittsburgh, Penn.

SYNOPSIS—*Method of preparing ash for fusion tests and determining initial softening temperature and interval of fusion. A tabulation of tests on West Virginia coals is included.*

INFORMATION concerning the fusibility of coal ash has become of considerable interest to the consumer of coal during the last few years, principally in connection with the troublesome formation of clinker which results from the melting of the ash constituents of the coal when subjected to heat.

The growing interest for such data has led the Bureau of Mines to make a general survey of the "fusing" or "softening" temperatures of the ash from well known American coals. It is hoped that this information when used together with the large number of coal analyses made available by the publications of the Bureau of Mines[1] will be of help to the consumer of coal in comparing the different coals and in the selection of the coal best adapted for his purpose.

This paper gives the results obtained for West Virginia coals, among which are found some of the purest fuels of the country.

The method employed for the fusibility tests was the standard gas furnace method[2] of the bureau. In order better to interpret the results given in the table of fusibility this method is briefly summarized here.

Preparation of Cones

The coal samples are ground to 60 mesh, with crusher, rolls and ball mill. This 60-mesh material is then placed in shallow fireclay roasting dishes and completely ashed in a muffle furnace at a temperature of 800 deg. C. to 900 deg. C.

The resulting ash is ground in an agate mortar to pass a 200-mesh sieve. To make sure that the coal has been completely ashed, the ash after grinding is placed in fused silica capsules and ignited at 800 deg. C. for two hours, a current of oxygen gas passing through the furnace during the ignition period. This ignition is made to insure complete and uniform oxidation of the ash.

A portion of the ash is transferred to an agate mortar, moistened with a 10 per cent. dextrin solution and worked into a plastic mass with a spatula. The ash is then molded into solid triangular pyramids ¾ inch high and ¼ inch wide at the side of the base. These cones are removed from the brass cone mold, dried and mounted in a vertical position in a refractory base made up of a mixture of two parts of kaolin to one part of calcined alumina. Usually five cones are mounted in the same base. The base with the cones is dried carefully over the hot plate until all water is driven off, then the dextrin is burned out of the cones by igniting the mounted cones in a muffle furnace at a dull red heat, after which the cones are ready for use.

Description and Operation of Furnace

The furnace used was the No. 3 melter's furnace (Fig. 1) of the American Gas Furnace Co., natural gas and air pressure of from 2 to 3 pounds to the square inch being used. The cones, supported by a suitable mounting, are placed within a covered fire-clay crucible in the furnace. A 2-in. hole is drilled through the furnace jacket and fire-clay crucible for observation purposes, a fused silica tube carrying a thin glass window being placed in the observation hole. At right angles to the observation hole a ¼-in. hole is drilled through the furnace and crucible. Through this hole a platinum-rhodium thermo-couple, protected by a glazed porcelain tube, is inserted. By proper adjustment of the gas and air a reducing atmosphere is maintained within the furnace, this being accomplished by using the minimum amount of air necessary to attain the desired temperature. Under these conditions, the iron in the ash is

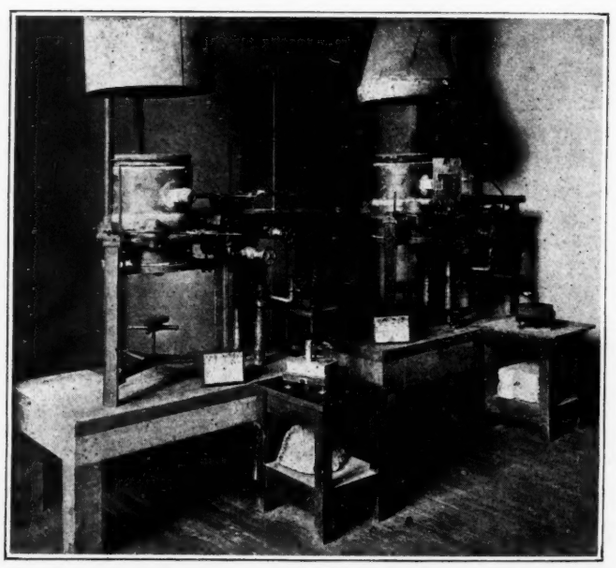


FIG. 1. NO. 3 MELTER'S FURNACE AND ACCESSORIES

reduced to the ferrous state, which condition gives the lowest melting points and therefore gives the lowest temperature at which clinkering may result. The temperature is gradually increased to 800 deg. C., when the rate is slowed down to not less than 5 deg. C. nor more than 10 deg. C. per minute, this rate being maintained until the end of the test, when a maximum temperature of 1500 deg. C., or 2732 deg. F., is attained.

In some instances with coal ash of an especially refractory nature the cones which did not fuse at the

*Published with the permission of the Director of the U. S. Bureau of Mines.

[1]Lord, N. W., and others: Analyses of coals in the United States, with descriptions of mine and field samples collected between July 1, 1904, and June 30, 1910: Bull. 22, Bureau of Mines, 1913, 1200 pp. (In two parts.)
Fieldner, A. C., and others: Analyses of mine and car samples collected in the fiscal years 1911 to 1913: Bull. 85, Bureau of Mines, 1914, 444 pp.
Fieldner, A. C., and others: Analyses of mine and car samples collected in the fiscal years 1913 to 1916: Bull. 123, Bureau of Mines, 1917, 456 pp.

[2]For detailed description of this method and discussion of the influence of various factors on the fusibility of coal ash see Fieldner, A. C.; Hall, A. E., and Feild, A. L.: The fusibility of coal ash: Bull. 129, Bureau of Mines, 1918. 146 pp. (In press.)

highest temperature attained in the gas furnace, were further heated in a molybdenum wire resistance furnace[3] in an atmosphere of hydrogen gas. Under these conditions temperatures as high as 3010 deg. F. and in some instances slightly higher were attained. However, a coal whose ash fuses above 2730 deg. F. should give very little trouble due to clinker formation.

The temperature readings taken were:

(1) *The initial deformation temperature.* The temperature at which the first rounding or bending of the apex of the cone takes place as shown in cone 1 of Fig. 2.

(2) *The softening temperature.* The temperature at which the cone has fused down to a spherical lump as shown in cones 2 and 3 of Fig. 2.

Only the average softening temperature is reported, together with the softening interval, which is the difference in degrees between the softening temperature and the initial deformation temperature.

Interpretation of Fusibility Table

According to the West Virginia Geological Survey there are 102 known coal beds in West Virginia, of which 52 are minable. The table contains samples representing nearly one-half of these minable beds, those listed being among the most important in the state.

The various beds are arranged according to their geological succession, from information supplied by courtesy of the West Virginia Geological Survey together with information taken from the Keystone Coal Catalog,[4] the uppermost coal beds being listed first.

It will be noted that the uppermost series given is the Monongahela series, there being no samples representing the overlying Dunkard series, which top out the highest beds in the Appalachian field; however, these coals are of very little commercial importance at the present time.

The results for each mine show the lowest softening temperature, the highest softening temperature and the average for the mine. The softening interval is tabulated in the same manner. In addition to these values the per cent ash and sulphur, on the dry coal basis, is given.

The average values given for each bed provide a means of comparison of the different coals; however, of course, the average values are averages of the mines which are listed under each bed, consequently the greater the number of mines sampled the more representative the values are of the bed. In some instances only a few mines are listed under the bed. In these cases the average values given are only representative of the mines sampled, and do not constitute a fair average of the bed. Beds such as the Pittsburgh, Sewell, Beckley and Pocahontas No. 3, from which a large number of samples have been tested and the softening temperature values for the various mines are uniform, the average values given may be taken as representative of the bed.

It will be noted that the softening interval values given in the table vary to a considerable extent. These values, as already explained, give the number of degrees interval between the temperature at which the tip of the cone fuses or bends and the temperature at which the cone has fused down to a spherical lump, which temperature is recorded as the softening temperature. The point at which the tip first fuses or bends is rather difficult to obtain exactly on account of the phenomena of warping and shrinking of the cones which sometimes result when the cones are subjected to heat. The softening interval is interesting mainly as a study of the viscosity of the melting ash. The softening temperature values given are the values which are used in comparing the different coals. This is the most definite and easiest point to check in the tests.

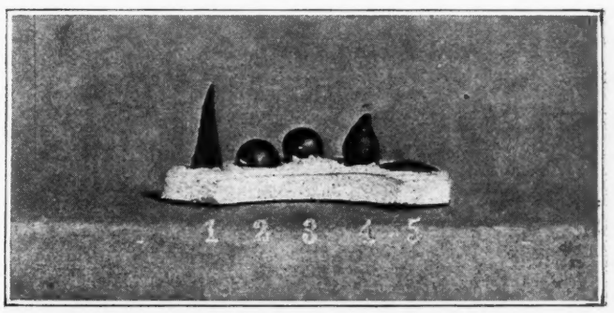


FIG. 2. TYPICAL FORMS OF CONES FUSED IN THE NO. 3 MELTER'S FURNACE

Under the Monongahela series the Sewickley, Redstone and Pittsburgh beds are listed. Not sufficient mines are represented to give representative average values for the Sewickley and Redstone beds. The Pittsburgh bed, which is the most important coal bed in the northern part of West Virginia and contains one of the most valuable fuels of the country, is fairly well represented. This bed varies considerably as to sulphur content in different regions. It will be noted, however, that the softening temperatures as given are fairly uniform, but are lower than many of the other beds listed.

Discussion of Coal Beds Tested

The mines listed under the Conemaugh series are all coal banks from the Mahoning bed, which is of no commercial value but is mined for local use. The average softening temperature from these coal banks is practically the same as that of the Pittsburgh bed.

In the Allegheny series the lower Kittanning or No. 5 Block bed is a very important coal. This bed varies from a high volatile coal in the southwestern half of the state through an ordinary bituminous type of coal in Randolph and Barbour counties to a semi-bituminous coal in the North Potomac basin.[5] As might be expected from a coal varying so much in composition, the values given for this bed vary over a wide range, but no doubt the mines listed give representative values for their immediate districts.

The coals listed under the Kanawha group of the Pottsville series are coals giving ash having a uniformly high fusing temperature. The No. 2 Gas is the most important and valuable bed of this group and is widely known commercially. This bed as well as others of this group contains coals giving ash having a high fusing temperature.

[3] Fieldner, A. C., and Feild, A. L.: "A New Method and Furnace for the Determination of the Softening Temperature of Coal Ash Under Fuel-Bed Conditions," *Journal of Industrial and Engineering Chemistry*, Vol. 7, No. 10, 1915, pp. 829-835.

[4] "The Coal Catalog, Combined with Coal Field Directory," for the year 1918, Keystone Consolidated Publishing Co., Pittsburgh, Penn., pp. 579-588.

[5] (a) West Virginia Geological Survey, Bull. II, "Levels and Coal Analyses," 1911, p. 296.

TABLE OF SOFTENING TEMPERATURE OF COAL ASH FROM WEST VIRGINIA COALS

Locality, Bed, Etc.			Number of Samples from Mine	Softening Temperature, Deg. F.			Softening Interval, Deg. F.			Average Analysis of Dry Coal, Percentage of	
				Lowest	Highest	Average	Lowest	Highest	Average	Ash	Sulphur
1			2	3	4	5	6	7	8	9	10
MONONGAHELA SERIES											
Sewickley (Mapletown) Bed											
County	Town	Mine									
Marion	Montana Station	Parker Run	5	2050	2120	2080	50	110	80	9.61	3.99
Redstone Bed											
Harrison	Lost Creek	Calif	4	2000	2140	2060	70	220	120	8.08	2.24
Harrison	Lost Creek	Righter No. 1	5	2030	2370	2180	70	360	170	6.07	1.66
Average Redstone Bed			9	....	....	2120	....	....	150	6.96	1.92
Pittsburgh Bed											
Braxton	Braxton	Braxton	1	....	....	2090	....	....	60	8.93	3.50
Brooke	Colliers	Lewis Finley No. 1	2	2070	2600	2340	110	180	150	6.28	1.75
Marion	Chiefton	Consolidation No. 47	6	2040	2170	2090	30	200	100	7.41	2.97
Marion	Fairmont	Consolidation No. 38	3	2100	2150	2130	100	190	140	6.97	2.29
Marion	Farmington	Consolidation No. 87	4	2010	2330	2230	30	70	50	6.61	1.23
Marion	Hutchinson	Consolidation No. 84	6	2010	2310	2230	10	330	120	7.12	1.98
Marion	Monongah	Consolidation No. 43	6	2170	2350	2270	30	120	70	6.27	1.07
Marion	Monongah	Consolidation No. 63	6	2200	2330	2270	40	100	60	5.84	1.07
Marion	Watson	Consolidation No. 26	5	2000	2260	2110	10	80	40	6.65	1.87
Marion	Worthington	Consolidation No. 86	4	2240	2410	2340	20	60	40	6.15	0.80
Marion	Worthington	Hutchison	3	2070	2170	2130	40	120	80	7.70	2.25
Marshall	Benwood	Hitchman	6	1940	2000	1970	50	80	60	8.33	4.65
Marshall	Moundsville	Mound	2	2020	2130	2080	120	230	180	12.44	6.09
Marshall	Moundsville	Panama	2	2070	2090	2080	110	140	130	7.29	3.33
Putnam	Black Betsey	Black Betsey No. 3	7	1930	2370	2140	70	250	130	7.39	1.94
Average of Pittsburgh Bed			63	....	....	2170	....	....	90	7.20	2.24
CONEMAUGH SERIES											
Mahoning Bed											
Hancock	Chester	Allison Coal Bank	1	....	....	2130	....	....	90	6.94	1.88
Hancock	New Cumberland	Martin Coal Bank	1	....	....	2300	....	....	260	4.13	1.46
Hancock	New Cumberland	McNeil-Harrin Coal Bank	1	....	....	2140	....	....	120	6.13	2.15
Hancock	New Cumberland	Wern's Coal Bank	1	....	....	2080	....	....	40	5.28	2.05
Average of Mahoning Bed			4	....	....	2160	....	....	130	5.62	1.89
ALLEGHENY SERIES											
Upper Freeport Bed											
Grant	Henry	Henry or No. 22	1	....	....	2190	....	....	220	6.17	1.97
Lower Freeport Bed											
Brooke	Steubenville, O. (opp.)	LaBelle	1	....	....	2100	....	....	130	7.12	1.98
Hancock	Chester	Sprout's Coal Bank	1	....	....	2070	....	....	90	12.55	4.29
Average of Lower Freeport Bed			2	....	....	2090	....	....	110	9.84	3.14
Middle Kittanning Bed											
Hancock	Chester	Line Island Coal Bank	1	....	....	2110	....	....	110	10.93	4.06
Lower Kittanning (No. 5 Block) Bed											
Clay	Widen	Rich Run	12	2430	+3070	+2730	*80	*280	+150	7.19	0.94
Hancock	Chester	Jones Coal Bank	1	....	....	2150	....	....	90	6.15	4.64
Hancock	New Cumberland	Crescent	1	....	....	2280	....	....	220	13.65	9.20
Kanawha	Putney	Putney No. 1	5	2250	+3010	+2780	*60	*250	*+100		
Preston	Corinth	Wills No. 3	1	....	....	2080	....	....	120	9.55	3.15
Preston	Kempton	Kempton or No. 42	1	....	....	2430	....	....	310	5.55	0.82
Tucker	Coketon	Coketon No. 36	1	....	....	3010	....	....	120	8.76	0.90
Average of Lower Kitanning (No. 5 Block) Bed			22	....	....	+2660	....	....	+140	7.64	1.76
POTTSVILLE SERIES—KANAWHA GROUP											
Coalburg (Buffalo Creek) Bed											
Kanawha	Ward	Kelly's Creek Colliery No. 3	6	2790	+3010	+2950	*30	*130	*80	8.75	0.75
Mingo	Chattaroy	Howard	1	....	....	3030	....	....	120	9.12	0.84
Average Coalburg (Buffalo Creek) Bed			7	....	....	+2960	....	....	80	8.80	0.76
Winifrede Bed											
Mingo	Chattaroy	Buffalo	2	3010	3010	3010	110	160	140	10.27	0.96
Mingo	Williamson	Sternberger	1	....	....	2850	....	....	250	8.10	0.68
Mingo	Williamson	Winifrede	1	....	....	3000	....	....	150	5.11	0.71
Average of Winifrede Bed			4	....	....	2970	....	....	170	8.44	0.83
Cedar Grove (Thacker) Bed											
Logan	Accoville	Island Creek	6	2520	+3010	+2690	80	*130	+100	5.82	1.28
Logan	Craneco	Lorado No. 1	5	2470	+3010	+2760	20	+160	+110	5.59	0.74
Logan	Omar	Main Island Creek No. 5	5	2390	2900	2600	40	80	140	5.62	0.88
Mingo	Chattaroy	Buffalo	1	....	....	2320	....	....	200	6.05	2.10
Mingo	Matewan	Red Jacket, Jr	1	....	....	2600	....	....	280	3.51	0.68
Mingo	Thacker	Thacker No. 3	1	....	....	2620	....	....	210	7.16	1.18
Mingo	Thacker	Thacker No. 5	1	....	....	2490	....	....	140	6.24	1.04
Mingo	Thacker	Thacker No. 9	2	2410	2460	2440	50	460	260	6.35	0.73
Mingo	Thacker	Thacker No. 11	1	....	....	2520	....	....	420	5.01	1.49
Mingo	Williamson	Winifrede	1	....	....	2390	....	....	260	8.28	1.98
Average of Cedar Grove (Thacker) Bed			24	....	....	+2610	....	....	+160	5.83	1.07
No. 2 Gas (Campbell Creek, Island Creek, Upper War Eagle) Bed											
Fayette	Longacre	Sunday Creek No. 114	6	2100	2520	2360	70	190	130	5.70	1.09
Fayette	Marting	No. 1	8	2850	+3010	+2950	70	*120	+90	6.32	0.92
Fayette	Page	Ansted	1	....	....	2430	....	....	90	6.61	1.81
Logan	Accoville	Big Eagle	7	2730	2960	2830	80	270	150	6.08	0.65
Logan	Earling	Earling No. 1	4	2850	2960	2940	70	140	110	5.10	0.71
Mingo	Merrimac	White Star	1	....	....	2540	....	....	140	3.78	0.66
Average of No. 2 Gas (Campbell Creek, Island Creek, Upper War Eagle), Bed Eagle (No. 1, Gas, Middle War Eagle) Bed			27	....	....	+2750	....	....	+120	5.86	0.88
Fayette	Boomer	No. 2 North	3	2900	+3010	+2940	50	*230	+150	4.40	0.77
NEW RIVER GROUP											
Sewell (Davy) Bed											
Fayette	Caperton	Sewell	5	2620	+3000	+2860	90	*360	+220	2.44	0.56
Fayette	Dun Loop	Dun Loop No. 2	4	2390	2980	2620	150	210	180	2.64	0.55
Fayette	Elverton	Elverton	4	2350	2650	2500	60	350	180	2.44	0.59

TABLE OF SOFTENING TEMPERATURE OF COAL ASH FROM WEST VIRGINIA COALS—Continued

Locality, Bed, Etc.			Number of Samples from Mine	Softening Temperature, Deg. F.			Softening Interval, Deg. F.			Average Analysis of Dry Coal, Percentage of	
				Lowest	Highest	Average	Lowest	Highest	Average	Ash	Sulphur
1			2	3	4	5	6	7	8	9	10
POTTSVILLE SERIES—NEW RIVER GROUP—Continued											
Sewell (Davy) Bed—Continued											
County	Town	Mine									
Fayette	Hawk's Nest	Mill Creek	4	2370	2730	2510	20	130	90	4.01	0.63
Fayette	Kay Moor	Kay Moor No. 1	5	2310	2930	2690	90	270	210	3.17	0.56
Fayette	Kay Moor	Kay Moor No. 2	3	2430	2640	2550	80	140	110	3.57	0.54
Fayette	Minden	Minden No. 2	3	2280	2640	2450	100	280	200	3.23	0.65
Fayette	Minden	Minden No. 3	1	....	....	2600	....	....	210	2.86	0.56
Fayette	Minden	Minden No. 4	3	2270	2710	2550	100	230	160	2.57	0.43
Fayette	Minden	Minden No. 5	4	2080	2620	2340	30	220	110	3.13	0.88
Fayette	Minden	Rock Lick No. 4	3	2370	2620	2520	50	130	100	2.43	0.45
Fayette	South Nuttal	Brown	4	2580	2830	2720	30	140	70	2.62	0.57
Fayette	Sun	Sun No. 1	5	2070	2550	2250	90	290	180	6.14	1.69
Greenbrier	Richwood	Spruce Knob	1	....	....	2960	....	....	430	6.04	0.65
McDowell	Big Sandy	Big Sandy	2	2290	2370	2330	70	170	120	3.60	0.53
McDowell	Coalwood	Nora or No. 3	4	2350	2490	2420	120	230	170	2.95	0.74
McDowell	Coalwood	Thelma or No. 6	7	2300	2650	2440	80	300	200	4.32	1.03
McDowell	Davy	Blackstone	1	....	....	2430	....	....	90	3.48	0.54
McDowell	Davy	Cletus	1	....	....	2430	....	....	60	2.67	0.51
McDowell	Davy	Helena	1	....	....	2460	....	....	80	3.18	0.58
McDowell	Marytown	Marytown	2	2520	2670	2600	80	110	100	8.95	0.75
McDowell	Roderfield	Davy or Pocahontas No. 2	3	2430	2980	2770	90	250	150	6.43	0.89
McDowell	Twin Branch	J. B. B. No. 1	1	....	....	2440	....	....	170	3.10	0.55
McDowell	Twin Branch	J. B. B. No. 2	1	....	....	3010	....	....	360	4.40	0.55
McDowell	Twin Branch	J. B. B. No. 3	1	....	....	2540	....	....	140	5.27	0.76
McDowell	Twin Branch	J. B. B. No. 4	1	....	....	2550	....	....	210	5.20	0.85
McDowell	Twin Branch	J. B. B. No. 5	2	2450	2550	2500	220	360	290	3.00	0.55
McDowell	Twin Branch	Maher or No. 4	9	2500	2730	2620	40	150	100	4.41	0.71
Raleigh	Cranberry	Cranberry	2	2460	2480	2470	130	150	140	....	....
Raleigh	Oswald	Oswald No. 3	3	2190	2590	2380	260	270	260	4.07	0.80
Raleigh	Tamroy	Tamroy	3	2540	+3010	+2850	*190	*190	*190	1.97	0.50
Randolph	Mill Creek	Tolbert and Spiker	1	....	....	+3010	....	....	....	11.43	0.52
Randolph	Spruce	Hopkins	1	....	....	+2730	....	....	....	13.85	0.99
Average of Sewell (Davy) Bed			95	....	....	+2560	....	....	+160	3.93	0.72
Welch (Tug River) Bed											
McDowell	Hemphill	Welch	5	2720	2970	2840	90	270	180	7.41	0.62
Beckley (War Creek) Bed											
McDowell	Roderfield	Davy Pocahontas No. 1	3	2520	2960	2720	60	140	100	11.31	1.82
McDowell	Susana Station	Yukon Pocahontas	4	2400	2620	2450	40	90	70	8.50	0.57
McDowell	War	John's Branch	4	2650	+3010	+2860	110	+160	+130	8.99	0.63
McDowell	War	War Creek	3	2730	2750	2740	40	80	50	8.62	0.72
Raleigh	Affinity	Affinity	7	2690	+3090	+3000	*40	*70	*60	4.19	0.56
Raleigh	Big Stick	Big Stick	11	2700	+3010	+2900	10	*220	80	4.36	0.53
Raleigh	Eccles	Eccles No. 5	5	2550	+3010	+2920	....	....	*200	6.44	0.78
Raleigh	McAlpin	McAlpin	2	2730	+3010	+2870	*240	*240	*240	2.65	0.65
Raleigh	McQuade Station	Blue Jay	3	2730	+3020	+2830	*160	*180	*170	4.38	0.75
Raleigh	Raleigh	Raleigh No. 1	2	2540	+3010	+2780	+110	+330	+220	3.49	0.67
Raleigh	Raleigh	Raleigh No. 3	5	2620	2900	2720	70	170	130	3.82	0.74
Raleigh	Slab Fork	Slab Fork No. 1	1	....	....	2580	....	....	210	2.87	0.61
Raleigh	Slab Fork	Slab Fork No. 2	8	2480	+3010	+2740	*150	*270	*180	3.69	0.50
Raleigh	Slab Fork	Slab Fork No. 3	7	2370	+3010	+2740	*120	*360	*190	4.03	0.54
Raleigh	Slab Fork	Slab Fork No. 4	1	....	....	2960	....	....	230	2.39	0.55
Raleigh	Slab Fork	Slab Fork No. 5	8	2520	+3010	+2760	*160	*320	*230	3.49	0.50
Raleigh	Tams Station	Tams	3	3010	+3010	+3010	*220	*220	*220	4.67	0.55
Raleigh	Winding Gulf	Lynwin	7	2620	+3010	+2860	*100	+*230	*+160	4.27	0.71
Raleigh	Winding Gulf	Winding Gulf No. 1	3	2730	+3020	+2920	140	*160	+150	3.05	0.47
Raleigh	Winding Gulf	Winding Gulf No. 2	2	2960	2990	2980	140	270	210	2.78	0.51
Raleigh	Wood Bay	McAlpine No. 1	8	2560	+3010	+2850	40	320	+140	3.66	0.60
Wyoming	Alpoca	Alpha	4	2120	2540	2360	210	340	270	4.45	1.05
Average Beckley (War Creek) Bed			101	....	....	+2800	....	....	+150	4.76	0.65
Fire Creek (Quinnimont) Bed											
Fayette	Layland	Layland No. 3	11	2480	2850	2660	*30	*280	*130	6.99	0.87
Fayette	Thayer	Ephraim's Creek (Buffalo)	3	2180	2580	2270	50	130	110	6.90	0.87
Fayette	Thurmand	Rock Lick No. 2	3	2210	2730	2390	100	179	140	4.90	0.68
Average Fire Creek (Quinnimont) Bed			17	....	....	2540	....	....	130	6.60	0.84
POCAHONTAS GROUP											
Pocahontas No. 6 Bed											
Mercer	Simmons	Buckeye No. 2	6	2290	2760	2400	60	190	120	2.88	0.70
Pocahontas No. 5 Bed											
McDowell	Faraday	Crockett Pressliz	1	....	....	2350	....	....	60	3.09	0.55
McDowell	Lex	Central West	2	2730	+3010	+2870	+110	+130	+120	7.80	0.65
Average Pocahontas No. 5 Bed			3	....	....	+2700	....	....	+100	6.23	0.62
Pocahontas No. 4 (Thin Vein Pocahontas) Bed											
McDowell	Big Four	Cirrus No. 2	1	....	....	2770	....	....	220	3.85	0.57
McDowell	Coalwood	No. 1	5	2100	2220	2170	50	120	70	5.29	0.67
McDowell	Coalwood	Olga	3	2030	2140	2080	50	100	80	6.43	0.77
McDowell	Huger	Middle States	6	2190	2730	2390	60	180	100	6.04	0.63
McDowell	Vivian	Carswell Shaft	3	2850	+3010	+2920	60	120	+80	6.81	0.61
McDowell	Welch	Oregon No. 2	2	+2730	+2730	+2730	....	....	....	7.52	0.53
McDowell	Welch	Oregon No. 3	3	+2730	+3010	+2900	*190	*190	*190	7.92	0.63
Average Pocahontas No. 4 (Thin Vein Pocahontas) Bed			23	....	....	+2480	....	....	+110	6.31	0.64
Pocahontas No. 3 (Pocahontas, Thick Vein) Bed											
McDowell	Algoma	Piney	7	2180	2300	2240	30	100	50	4.79	0.56
McDowell	Arlington	Arlington	3	2450	2630	2520	120	360	240	3.80	0.43
McDowell	Bear Wallow	Roanoke	4	2190	2330	2270	140	230	210	6.38	0.44
McDowell	Berwind	Berwind No. 1	3	2280	2450	2360	200	320	260	5.17	0.90
McDowell	Berwind	Berwind No. 2	3	2170	2340	2250	70	190	140	7.54	0.87
McDowell	Berwind	Berwind No. 3	3	2380	2510	2460	140	350	210	5.90	0.88
McDowell	Berwind	Berwind No. 4	2	2300	2340	2320	160	260	210	5.30	0.95
McDowell	Big Four	Cirrus No. 2	4	2200	2340	2290	60	100	80	4.56	0.63
McDowell	Cooper	Tug River	4	2320	2690	2480	90	380	200	2.90	0.46
McDowell	Crystal	Crystal No. 1	2	2590	2610	2600	120	180	150	4.30	0.53
McDowell	Crystal	Crystal No. 2	4	2410	2520	2480	150	330	270	4.50	0.64
McDowell	Crystal	Godfrey	3	2370	2580	2490	130x	180	150	3.88	0.73
McDowell	Eckman	Pulaski No. 2	16	2240	2500	2300	20	230	100	4.56	0.59
McDowell	Eckman	Pulaski No. 3	4	2170	2270	2210	20	130	60	4.31	0.63

TABLE OF SOFTENING TEMPERATURE OF COAL ASH FROM WEST VIRGINIA COALS—Continued

Locality, Bed, Etc.			Number of Samples from Mine	Softening Temperature, Deg. F.			Softening Interval, Deg. F.			Average Analysis of Dry Coal, Percentage of	
				Lowest	Highest	Average	Lowest	Highest	Average	Ash	Sulphur
1			2	3	4	5	6	7	8	9	10
POTTSVILLE SERIES—POCAHONTAS GROUP—Continued											
Pocahontas No. 3 (Pocahontas Thick Vein) Bed											
County	Town	Mine									
McDowell	Eckman	Shawnee	3	2300	2380	2330	20	90	60	5.67	0.52
McDowell	Elkhorn	Delta	1	....	....	2390	....	....	150	....	....
McDowell	Elkhorn	Houston No. 1	2	2190	2240	2220	70	110	90	4.60	0.48
McDowell	Elkhorn	Houston No. 2	3	2120	2730	2330	50	100	70	5.00	0.45
McDowell	Elk Ridge	Elk Ridge	2	2410	2430	2420	150	210	180	5.48	0.61
McDowell	Gilliam	Gilliam	4	2180	2300	2250	120	140	130	6.09	0.48
McDowell	Hartwell	Berwind No. 5	3	2190	2410	2290	110	310	190	4.17	0.83
McDowell	Havaco	Havaco	5	2190	2640	2350	50	150	90	5.66	0.74
McDowell	Havaco	Havaco No. 41	1	....	....	2240	....	....	170	8.19	0.81
McDowell	Huger	Lake Superior No. 1	6	2280	2370	2310	40	60	40	4.66	0.73
McDowell	Huger	Middle States	1	....	....	2420	....	....	90	8.78	0.85
McDowell	Jenkinjones	Pocahontas No. 6	11	2170	2390	2240	40	220	90	4.92	0.51
McDowell	Jenkinjones	Pocahontas No. 6-B	2	2220	2280	2250	20	60	40	5.68	0.48
McDowell	Jenkinjones	Pocahontas No. 7	9	2120	2490	2270	20	170	110	5.62	0.53
McDowell	Jenkinjones	Pocahontas No. 7-A	1	....	....	2450	....	....	210	4.99	0.49
McDowell	Jenkinjones	Pocahontas No. 8	9	2190	2450	2320	40	300	140	5.16	0.59
McDowell	Kimball	King	4	2160	+3010	+2420	*80	*150	*120	4.83	0.44
McDowell	Leckie	Leckie No. 1	6	2510	2830	2710	100	180	140	3.32	0.57
McDowell	Leckie	Leckie No. 2	5	2510	2790	2640	80	160	120	3.39	0.55
McDowell	Lick Branch	Delta	3	2190	2230	2210	80	140	110	4.30	0.45
McDowell	McDowell	McDowell	3	2420	2490	2450	40	290	150	3.93	0.43
McDowell	Maybeury	Norfolk	2	2690	2730	2710	120	140	130	10.33	0.55
McDowell	Newhall	Berwind No. 6	2	2540	3070	2810	220	290	260	4.90	0.63
McDowell	Newhall	Berwind No. 7	3	2520	2730	2610	110	250	190	4.27	0.63
McDowell	Newhall	Berwind No. 8	3	2520	2970	2690	90	320	190	4.43	0.65
McDowell	North Fork	Rolfe	6	2220	2640	2400	40	250	120	4.42	0.52
McDowell	Vivian	Tidewater	3	2240	2300	2270	70	180	110	5.63	0.55
McDowell	Welch	Standard Pocahontas	2	2430	2470	2450	70	100	90	7.36	0.97
McDowell	West Vivian	King No. 98	1	....	....	2280	....	....	70	4.53	0.58
Mercer	Coaldale	Coaldale	3	2300	2540	2410	140	190	160	4.07	0.70
Mercer	Goodwill	Goodwill	4	2540	2710	2620	60	130	90	3.37	0.58
Mercer	Goodwill	Louisville No. 1	1	....	....	2410	....	....	100	3.43	0.59
Mercer	Goodwill	Louisville No. 2	4	2490	2710	2640	100	160	130	3.82	0.53
Mercer	Goodwill	Louisville No. 3	1	....	....	2690	....	....	140	3.25	0.55
Mercer	McComas	Sagamore No. 1	3	2430	2600	2540	80	190	140	4.47	0.50
Mercer	McComas	Sagamore No. 2	3	2460	2520	2490	160	220	200	3.87	.43
Mercer	Matoaka	Pawama No. 1	2	2450	2580	2820	80	300	190	3.85	0.77
Mercer	Matoaka	Pawama No. 2	3	2580	2660	2620	60	80	70	4.34	0.79
Mercer	Motoaka	Thomas No. 1	5	2440	2610	2520	40	440	240	5.30	0.54
Mercer	Motoaka	Thomas No. 2	4	2650	2960	2750	80	260	170	4.95	0.52
Mercer	Mora	Crane Creek No. 1	2	2390	2620	2500	130	300	220	3.88	0.59
Mercer	Mora	Crane Creek No. 2	3	2530	2730	2600	100	360	240	4.80	0.55
Mercer	Mora	Pinnacle	5	2350	2530	2470	120	400	240	3.48	0.54
Mercer	Mora	Sagamore No. 1	3	2410	2530	2460	170	190	180	3.93	0.56
Mercer	Mora	Sagamore No. 2	4	2470	2510	2490	40	230	140	4.10	0.59
Mercer	Simmons	Booth-Bowen	3	2470	2540	2500	40	250	140	4.40	0.58
Mercer	Simmons	Buckeye No. 1	3	2370	2530	2480	40	210	140	3.40	0.60
Mercer	Springton	Modoc No. 1	4	2600	3050	2740	40	170	90	3.66	0.59
Mercer	Springton	Modoc Nos. 2 and 3	4	2510	2720	2640	50	120	80	3.67	0.57
Mercer	Weyanoke	Weyanoke No. 1	9	2450	3010	2690	80	340	190	4.40	0.59
Mercer	Weyanoke	Weyanoke No. 2	1	....	....	2570	....	....	100	4.05	0.60
Mercer	Widemouth	Piedmont	4	2690	2890	2800	60	120	80	5.73	0.52
Average Pocahontas No. 3 (Pocahontas Thick Vein) Bed			246	....	....	2440	....	....	140	4.70	0.59

NOTE—A plus sign (+) placed before a given value denotes that the true value is above that indicated. An asterisk (*) placed before a given value denotes that the values given are those actually observed; however, a temperature high enough to fuse all of the samples was not attained, therefore the true value might be either greater or less than the indicated value.

The New River group of the Pottsville series contains some of the best known coals of the country, coals having a low ash and sulphur content, also giving an ash with a high fusing temperature.

The Sewell bed, which is the most important of the New River group, is very well represented in the table. The mines tested give a very uniform fusibility of ash value, and the average value for the bed is good. This coal, which is semi-bituminous in character, is one of the famous steam-producing coals of the country and at the present time is the most extensively developed of the New River coals.

The Beckley bed, which is a very important member of the semi-bituminous coals of the New River group, shows some remarkably high fusibility values. The ash from this coal is of a specially refractory nature and this bed gives fusibility values higher than any other of the beds of West Virginia that were tested. This coal should prove of interest to consumers demanding a high grade coal giving an ash of an exceptionally high fusibility.

The last group listed and the oldest and lowermost of the West Virginia coals is the Pocahontas group, which contains the famous Pocahontas No. 3 bed of Mercer and McDowell counties. This seam produces the well known Pocahontas semi-bituminous coal, which is one of the purest coals of the country and is being used extensively as a steaming and coking coal. The average values given for this bed represent 246 samples, so they should be considered to be representative of this celebrated coal.

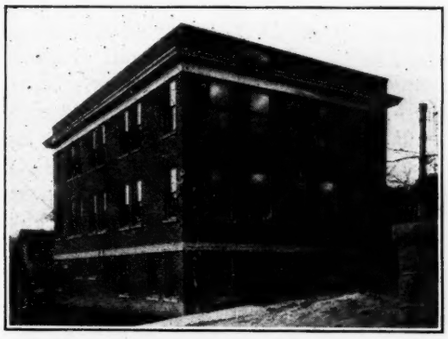
As is seen, the figures representing the different mines are very uniform. Although the average softening temperature of this bed is not as high as some of the others, especially the Beckley bed, it is uniformly high and little trouble should therefore be experienced because of clinkering.

Grateful acknowledgment is made to A. C. Fieldner, chemist, formerly of the Pittsburgh Station of the Bureau of Mines, under whose supervision most of the tests were made. Many of the tests were made by Messrs. A. E. Hall, V. C. Allison, C. R. Locke, C. S. Purcell, W. C. Ratliff and O. C. Brown, all of the chemical laboratory of the Bureau of Mines.

Science and Research in Coal Mining

By GEORGE W. HARRIS
Editorial Staff *Coal Age*

SCIENCE in coal mining is an old expression with a new significance. Research work along technical lines has been encouraged and fostered by the Consolidation Coal Co. for years. Consulting Engineer Frank Haas has been guiding the company's able assistants of the laboratory and engineering forces in their efforts to develop something practical. No expense has been spared, and it was mainly through the patient coöperation of these technical workers in the field of science that such satisfactory results have been achieved—of practical benefit to operator and miner alike. Notable among these achievements is the application of gas analysis to the scientific control of mine ventilation; the idea of the gas test being the immediate safety of the miner and the mines.



LABORATORY OF CONSOLIDATION COAL CO. AT FAIRMONT, W. VA.

This method of gas control is peculiar to the Consolidation Coal Co., and the same system is in vogue in all the fields in which coal is mined by this company. Conceived by Mr. Haas, the method has been fostered by him for many years; all field and laboratory reports on gas and ventilation details are submitted to him, and his judgment dictates the policy of the company in such matters. The ventilation problems differ somewhat in the various fields. For example, the situation in the Fairmont-Clarksburg region of West Virginia is the most critical, as here gas is met with in appreciable quantities—methane or firedamp especially being present in some sections. The numerous natural gas wells throughout this field also tend to complicate matters materially. On the other hand, in the Georges Creek region in Maryland, blackdamp and mine fires claim especial attention.

The Consolidation mines are classified, as regards the gas test, into three groups. Those that yield no gas, moderate gas producers, and mines that make more than an average amount of gas. A regular force of men is detailed to collect samples of gas in the mines and to look after the ventilation. Such men also act as a first-aid corps and as fire fighters; they are thoroughly experienced in the use of oxygen apparatus and so on. However, it is only occasionally that they are called upon for fire or first-aid service. Nevertheless, at least five men are always immediately available should the occasion come up for their use. All Consolidation mines are tested once a month; those of the second or medium class once a week, and mines which produce more than an average amount of gas are tested daily.

The field gas-testing forces report to Mr. Haas daily, so that no critical situation fails to be brought quickly to his attention and his judgment is final in all such matters. The field forces have no authority in themselves, but tney are independent of the operating department. However, being on the ground they naturally confer with local officials. When changes in ventilation are necessary they are promptly made. There is practically always sufficient coöperation between the two departments so that there is no difficulty to get the results desired. If at any time a conflict of opinion should occur, the matter is settled by a higher authority—Mr. Haas or a division manager. There is no friction. The percentage of gas is kept strictly to less than five-tenths of one per cent., and quick action is secured in critical cases. Also 100 per cent. humidity is aimed at to keep down the dust in the mines.

The corps taking gas samples are entirely separate from the ordinary inspection and safety men. Each man on the corps is made capable of handling the ventilation proposition in the field; each man is equally responsible, but naturally the oldest man in the service takes the lead. Corps are interchanged from time to time in each division. Also men are brought from other divisions for a limited time so that they may learn something about conditions different from those encountered in their own field. The result of this system is the decidedly lessened tendency to explosions and fires.

A person traveling about any of the fields in which the Consolidation operates can hardly fail to notice men going from mine to mine with their copper cans. Often about a dozen cans are carried at a time. Each can holds something over a quart or a sufficient amount of gas for two or three analyses. On reaching a mine the cans are filled with water, and when a sample of mine air is to be taken the stopcock at each end of the can is opened—as the water runs out of one end the air enters the other. At this time the can is not necessarily placed in any special part of an entry—usually where a man would naturally hold it. Ordinarily the sample is taken in the moving air where the mixture is complete. When gob gases are to be tested it is a different matter, and the sample of air is taken close to the gob where there may be little or no ventilation.

In addition to the samples of gas considerable other information is obtained by the gas inspectors on their daily rounds, which is entered on the gas report. Continuous barometric readings have been taken by the Consolidation company for the last 15 years, and it has not been noticed that changes in barometer have an appreciable effect on the flow of gas in their mines. This is a matter about which doctors disagree. The evidence on this point by a company which operates a large number of mines in the four principal fields of the Appalachian coal basin is valuable. Furthermore, the observations cover a long period of time.

One of the large anthracite coal companies in Penn-

sylvania gives contrary evidence. This latter company notes carefully every change in the barometer at its main office. On a decided drop in barometric pressure, warnings are at once sent to all the company's mine foremen notifying them of the fact. Thus warned they watch for danger signs in their mine air. It is a matter of record with this anthracite company that practically all their mine explosions, for the time under observation, have occurred during falling barometer or at times of low barometric pressure. It may easily be that these apparently diverse opinions may not be antagonistic in the face of more complete details covering each case. The matter is considerably more than technically interesting, for it has an important practical bearing on mine operation. The Consolidation company takes the readings of an instrument on the top of its office building in Fairmont and assumes this barometric pressure to be correct for the whole Fairmont-Clarksburg field. This matter was investigated for several years before the plan noted was adopted.

By referring to the accompanying reproduction of the gas report sheet used by this company, it readily will be seen what information the gas inspection corps must secure. On this report illustrated, a cross (X) indicates information which must be obtained in the field; from these data the "Dew Point," "Relative Humidity" and "Gal. (of moisture) per 1000 C.F." (cu.ft.) are calculated in the office; the percentages of CO_2 (carbon dioxide) and CH_4 (methane) are determined in the laboratory. In further explanation of the report it should be added that gas samples are taken on the main intake and return; this gives the condition of the air for all splits collectively. In addition a sample is taken on the intake and return of each split; these samples are taken close to the main entries. Thus the exact condition of each portion of the mine is determined.

THE CONSOLIDATION COAL COMPANY, INC.

GAS REPORT

Mine.....x.....

Weather....x.... Temp.....x..... Humidity.....x..... Bar.....x..... Fan. W. G ...x..... Date .....x.....

Location	Time	Split	Area	Vel.	Cu.Ft.	Dry Bulb	Wet Bulb	Dew Point	Relative Humidity	Gal. per 1,000 C. F.	Per Cent. CO_2	Per Cent. CH_4	Lab. No.
Intake	x	Main.....	x	x	x	x	x	Calculated	Calculated	Calculated	From analysis	From analysis	x
Return	x	Main.....	x	x	x	x	x	Calculated	Calculated	Calculated	From analysis	From analysis	x
Intake..	x	First split.....	x	x	x	x	x	Calculated	Calculated	Calculated	From analysis	From analysis	x
Return	x	First split.....	x	x	x	x	x	Calculated	Calculated	Calculated	From analysis	From analysis	x
Intake	x	Second split.....	x	x	x	x	x	Calculated	Calculated	Calculated	From analysis	From analysis	x
Return	x	Second split.....	x	x	x	x	x	Calculated	Calculated	Calculated	From analysis	From analysis	x
Intake	x	Third split.....	x	x	x	x	x	Calculated	Calculated	Calculated	From analysis	From analysis	x
Return	x	Third split.....	x	x	x	x	x	Calculated	Calculated	Calculated	From analysis	From analysis	x

Ascertain and Note:—Speed of fan (r.p.m.) blowing or exhausting; putting steam into air or not; mine working or idle; total volume air entering mine and exhausting from mine; volume of CH_4 (methane) produced in 24 hours.

In the matter of temperatures, the outside temperature is taken before entering the mine and again on coming out. The main intake temperature and bulb readings are taken just inside the point where the air is humidified by exhaust steam (within 150 to 200 ft. inside) or at any point on the main intake between the point noted and the first split on the main headings. Suspended moisture is not indicated by the bulb.

In the laboratory two samples are taken from each can and the gas is analyzed by the Hesse method—a titration process which gives result within $\frac{1}{100}$ of one per cent. One of the gas samples taken is analyzed for CO_2 and the other one for CH_4. When a complete analysis of gas is desired, the Burrell apparatus is used. This latter method is employed in the case of special investigations and gives results for CO_2, O, CO, H, CH_4 C_2H_6 and heavy hydrocarbons. In its investigations, this company reports that it has never found any hydrogen in the mine air of its operations. The special investigations in which the Burrell method is used include analyses of gas in the case of mine fires, gob trouble, gas feeders, and so on. In the case of a mine fire, the mine is sealed off and pipes are placed in the stoppings so that samples of gas can be taken at intervals for analysis. The analyses of such samples show the condition of the mine air in the isolated section and are a reasonably safe indication of what is happening in the fire area. As long as any oxygen is found in the air, combustion can be supported and it would not be safe ordinarily to assume that the fire had died out.

In connection with mine fires and gas analysis there would seem to be a particularly profitable field in Illinois for the safety method employed by the Consolidation. In portions of this state the mines are quite gaseous and the coal contains more or less sulphur. Added to these conditions is the customary practice in many sections of not robbing any pillars. In mines where unsystematic or loose methods of mining are in vogue there have been many squeezes and much loss of coal. These are ideal conditions for just what has happened in many instances—gob fires. From this start, pillars have been fired and oftentimes serious loss of time and money have occurred before the mine could again resume operations. These conditions have been so familiar throughout many portions of the state as to breed contempt in some cases. It would seem that the larger companies at least in Illinois could to advantage adopt a system of gas analysis and inspection, which would practically insure their mines against ordinary fires. If a gob fire is taken in hand in its early stages little trouble should be experienced. Many of the mines in this territory are dry. Gob fires, dust and gas furnish ideal conditions for trouble.

In the Consolidation practice the complete gas reports are regularly handed to Mr. Haas, who thus keeps in close touch with ventilation conditions throughout the mines of his company. The ventilation is changed in individual mines from time to time as the tests of air are interpreted to show this necessity. The rate of flow of gas may increase or decrease in various parts of a mine or in the mine as a whole.

About the first of October a change from wet to dry condition of the mines generally occurs in West Virginia. As the temperature of the atmosphere de-

creases less moisture is carried into the mines and the dust tends to dry out. Now is the time to use extra precaution to see that the humidity of the mine air does not drop with the temperature. Most of the dust explosions occur in the winter.

When the percentage of methane (CH_4) closely approaches five-tenths of one per cent., the gas is further diluted to render mine conditions safe. Furthermore, the mine air is kept saturated with moisture as far as practicable and the reports usually indicate a humidity of nearly 100 per cent. in the mine air. When the degree of humidity drops, more moisture is turned into the workings—either the exhaust from a fan or other engine or by means of occasional sprinkling.

This company keeps records of the flow of gas in its mines in graphical form. Curves show conditions of gas flow of mines from year to year; being platted on a small scale, daily variations are not prominent. Monthly increase or decrease is well brought out, however, and much interesting data are presented. Some workings show a rapid and regular increase of gas flow from the time shipments of coal start at a plant until considerable development has been secured. After a time the curve has less fluctuation and then settles down to a steady and uniform flow for years. A vast amount of instructive information has been accumulated by Mr. Haas on gas control and mine ventilation.

Recently the company has opened a number of new mines which are planned to be big producers. These workings seem to have tapped a particularly gassy section and their development has been watched with the greatest care. Mine maps of these workings were tacked up on the walls of an office at headquarters; they were drawn to a scale sufficiently large to show all necessary details. In the early development stage the ventilation of the workings was most critical. The gas inspectors went to each and every working face each day, following the entire air current to investigate exact conditions. The inspectors reported at night at headquarters and the information was actually placed on the mine map. The exact condition of the ventilation was shown by a thread which was carried from point to point around pins placed on the map at turns of the ventilation current. All brattice was marked and the map showed that every face was ventilated. The mine workings were extended daily from measurements of inspectors or engineers. If any face was shown ahead of ventilation the matter was investigated at once. This was done until the mine was opened up sufficiently to have conditions stabilized, after which the work was not carried out in such exact detail.

Most detail work carries with it a certain amount of drudgery, but the men on the gas corps have an unusual opportunity. They must have both technical and practical experience on this work. Often they are practical men trained in the technical line of their work by the head of the department. These men go to all parts of the company's mines in a region and at intervals they are sent to the plants of other divisions. Thus they have fine opportunities to become thoroughly acquainted with ventilation, methods of mining, conditions of seam occurrence and the thousand and one details connected with coal mining. An ambitious fellow would have every opportunity to satisfy his desire for information along coal lines.

After following the details of this system of gas analysis and control, it would be amiss not to enlarge on some of the other and more or less related activities of the Consolidation laboratory. The same guiding hand has to do with all such interests; in the laboratory, Mr. Haas is assisted by W. D. Barrington, assistant engineer of tests.

The chemistry and physics of coal are most important adjuncts of the field of mining. An interesting description of the laboratory of the Consolidation Coal Co. appeared on page 235 of the Aug. 11, 1917, issue of *Coal Age*. As the organization of this establishment was perfected its activities broadened. Here all materials and supplies purchased are analyzed and a great deal of other work is done. Coal is tested frequently enough to keep track of all changes and conditions of seam in the mines. In this way the company maintains a high standard of preparation of all coal shipped. Government regulation of coal distribution is supreme; each shipper disposes of his product to points designated, different grades of coal being diverted to the trade best served by coal of certain characteristics. The Consolidation sometimes takes the initiative in such matters, being guided by its complete knowledge of coal leaving its mines—a discretion concurred in by the authorities.

Considerable bacteriological work is done in this laboratory on the water being used for drinking and domestic purposes, as well as a complete chemical analysis of water in connection with boiler feed-water supplies. The drinking water is given especial attention; its use is stopped at once when it is found to be unfit for such purposes. The wells are cleaned out and sterilized with a chloride of lime treatment. Immediately after cleaning, another sample of the water is taken for bacteriological analysis and results determined before the people are permitted to use the water again.

The laboratory at Fairmont is not duplicated in the other regions, but each division of this company has a laboratory equipped to handle minor analyses of gas. Delay in receiving the results of gas analysis for ventilation control would rob the system of most of its benefits. The main laboratory is equipped to carry out complete analytical work on coal and also to make calorimeter tests for heating value. The company able to run a laboratory of this kind is fortunate indeed. In addition to the routine work of an establishment of this kind, there is opportunity for considerable original research. All of this information is valuable to a company beyond the interest on the investment the establishment represents and the money paid out in salaries to employees and for materials used. The moral effect on the progressive foremen and others connected with the company should act as an incentive to further effort along technical lines. If some of the information obtained was presented in a popular way, it might incite an interest among the motor and machine runners and many others to improve themselves in scientific matters.

The greatest deposit of lignite known in the United States lies in Texas. A strip of territory from 50 to 100 miles wide and over 500 miles long runs diagonally across the eastern section of the state. Under this area there has been estimated to lie about 30 billion tons of lignite.

NEW APPARATUS AND EQUIPMENT

New Electric Safety Lamp Possesses Many Valuable Improvements

The Koehler Manufacturing Co., of Marlboro, Mass., will shortly place upon the market a new type of miner's lamp, named after its inventor the "Wheat" electric lamp. This lamp differs in many details from preceding lamps of this general type. It is designed for use in gaseous mines, powder magazines, gas or oil vapors, and in fact wherever explosive mixtures of gas or dust and air may occur. Furthermore, since the material of which the lamp is made is chemically inert, it is also an excellent illuminant for use around salty or sulphurous waters, in acid vapors or other places where corrosive atmospheres are encountered. Under such conditions these lamps, because of their non-corrodibility, retain their appearance and perform their intended functions indefinitely without the use of paint.

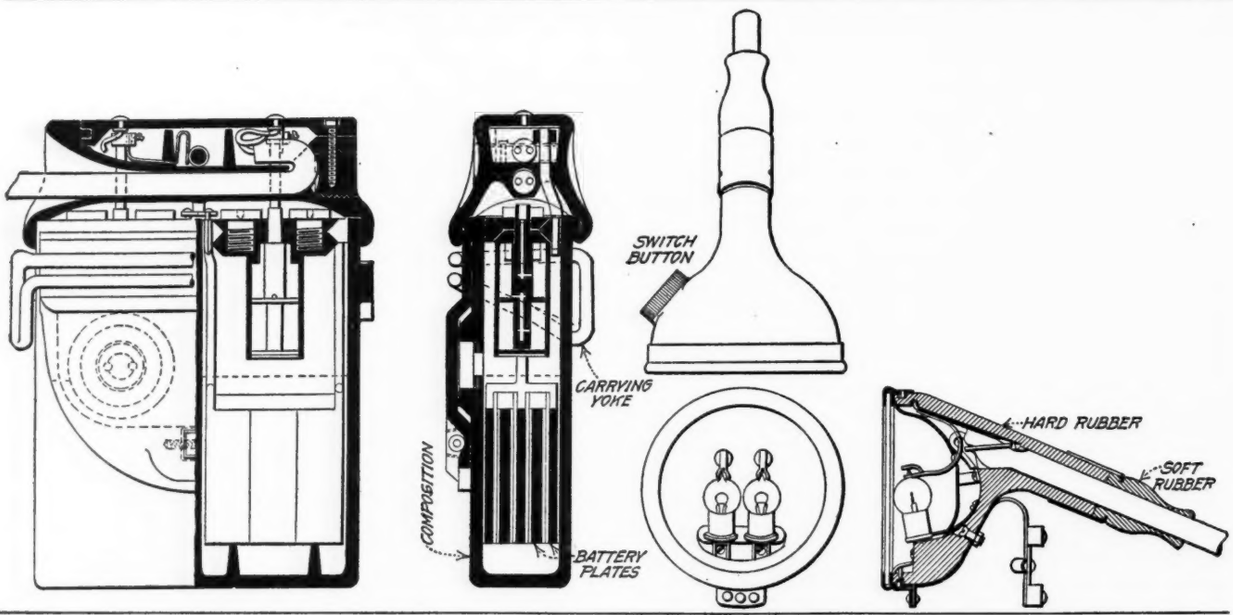


FIG. 1. BATTERY AND HEADPIECE OF THE WHEAT ELECTRIC SAFETY LAMP

The battery, which is of the lead-acid type and of rugged construction, is composed of two cells. These are placed in a hard rubber composition container of heavy construction and held in place by a soft compressible rubber gasket. The electrolyte is of course suitably gas-vented, but as may be seen in Fig. 1 the arrangement is such that no liquid, even under extreme circumstances, can escape. Turning the battery upside down and violently shaking for some time will not permit so much as one drop to leave the container.

Electrical connections to the cap cable are made in the upper portion of the battery case. This portion may be separated from the lower portion, but its removal requires the use of a special key spanner. The storage battery consists of two cells each having two positive and three negative plates. The rated capacity is 6 amp.-hr., but in practice it considerably exceeds this rating.

The conductor connecting the battery and cap lamp proper is of a twisted or spiral cable type properly insulated and covered. In this construction short-bending or kinking of the cable is not injurious. The cable leaves the battery, as may be seen in the cross-section, through a coned opening. It is so securely anchored in the battery that the battery may be safely handled by means of the cable. The cable may be grasped at any point in its length and the battery case shaken violently without injury to anything. The cap lamp might of course be treated in like manner, but being lighter the actual stress upon the cable would be much less.

The cap lamp or hemispherical reflector contains two lamp bulbs instead of one, as is usually the case. A suitable switch permits turning the current upon either bulb (but not both simultaneously) at will. Thus should one filament burn out or one bulb break, current may be immediately switched to the other. The possibility of the miner being left in darkness or of two men being compelled to make a long trip to the lamphouse to renew one bulb is thus obviated.

The two lamp bulbs in the cap piece are each held in place between two springs, one clasping the base while the other bears upon the upper end of the bulb. Should either bulb at any time be fractured regardless of whether the lamp is burning or not, these springs instantly flip the bulb or what remains of it out of place, breaking the electrical contact. This is a safety feature of no small importance.

The cap piece is inspected at the charging station and the lamps tested by turning the switch button that lights them in succession The case is sealed with a small lead seal bearing the lampman's or inspector's mark or initial. This seal may be readily cut should access to the interior of the case be desired, but cannot be replaced by any unauthorized person without detection. The cap piece and reflector are so designed as to spread the light rays over a 7-ft. circle at a distance of 20 in. No spots or shadows are made. The light strength is 22 lumens and the rating of the lamp and battery is 12 hours continuous burning when using a 4-volt, ½-amp. bulb. About once in two weeks it is necessary to add distilled water to the electrolyte until it reaches the level of the filling plug on the back of the battery case.

FIG. 2. BATTERY, CAP, LAMP AND BELT

One feature of this outfit that will appeal to some operators is the ease and safety with which it may be used to fire shots. The charging contacts are on the top of the battery case and almost flush with it. Connection between these terminals and the battery proper is made through an inclosed switch operated by a special key spanner. When it is desired to use the battery for shot-firing the procedure is as follows: The firing fuse wires are brought to and pressed upon the charging terminals. The special key is next inserted in the switch and turned. After a slight rotation of the switch the cap lamp goes out, while a further rotation connects the charging terminals with the battery and fires the shot or shots. A reverse rotation of the switch key first disconnects the charging terminals and then connects the battery to the cap lamp, relighting it. It is practically impossible for any person not holding a switch key as above described to manipulate the switch and fire shots in this way.

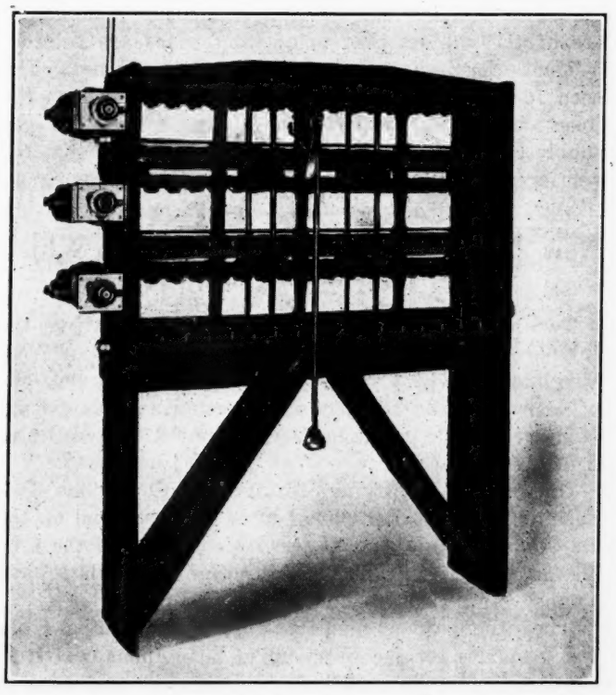


FIG. 3. CHARGING RACK FOR NEW LAMPS

This outfit is worn in the ordinary manner, the battery being carried on the belt and the cap piece fitting the lamp bracket on the ordinary miner's cap. The battery, as may be seen in Fig. 2, is attached to the belt by means of a double welded steel or aluminum rod that embraces the battery case on three sides. The weight of the battery thus comes upon the belt at two points separated by the full width of the case. The cap piece is so made as to clamp securely to the sides or edges of the lamp bracket on the cap. It can be attached readily but cannot be shaken loose.

The total weight of the entire outfit is slightly over 4 lb. The battery alone weighs 3 lb. 8 oz., and the cap piece complete weighs 11 oz. This lamp is now in everyday use at a large anthracite colliery.

Moving Pictures as an Aid to the Salesman of Mine Machinery

The Manierre Engineering and Machinery Co., of Milwaukee, Wis., has introduced the "movies" into the field of salesmanship in order to help sell its coal-loading machinery. The company's salesman carries a moving-picture outfit in his hand, as the ordinary salesman does his "grip," and if he can get 15 min. of a coal operator's time he gives him an interesting movie entertainment on the spot.

The prospective buyer, if he is a large operator, with mines, docks or storage plants, in this manner can see the different varieties of loading in which he is interested at one sitting. He does not have to travel out of his office to see a machine in operation. He is saved time, trouble and much discomfort, and withal he sees more than he could if a machine were actually operating before his eyes, because the views taken of the company's loader working inside a box-car make it unnecessary for one to stick his head inside a box-car filled with fine coal dust in order to view the operations. When taking the pictures the camera was set in an open car, and the coal travels before one's eyes, in clear daylight. The views show the coal coming down the chute from the tipple, into the hopper, thence traveling the length of the belt, or steel apron. The coal is first delivered to the floor, the conveyor rising as the pile grows, backing up, and turning round as the car fills.

A moving-picture man who can show so much in a short time can interest his prospect and gain an audience, where a busy operator would otherwise be inaccessible. The "movie" show may be made to cover the company's complete line of machines—those for loading lime, gravel and other materials—as well as coal. The Manierre moving-picture salesman, it is stated, is at the service of all those interested, and it is believed that the performance is worth the careful consideration of operators who have a coal-loading problem.

Anthracite Distribution Committee Gets Excellent Results

One effect of the Senate coal investigation has been a searching probe of the affairs of the Committee on Anthracite Distribution. It has led the members of that committee to throw open the record of the entire work to all interested. As a consequence, the committee has been given a clean bill of health, not only by officials but by others who have looked into their affairs. Not only has the conduct of the committee been entirely wholesome, but the investigation of its affairs has shown that a remarkable degree of efficiency was maintained. The degree of efficiency is shown by the fact that at Christmas time not a single city in the United States reported a serious need for anthracite with the single exception of Elizabeth, N. J. Emergency supplies were rushed to that point to substitute for a delayed consignment.

Questions asked during the coal hearings inferred that as evidence that improper motives existed on the part of the anthracite committee is the fact that it paid its own office expenses for some clerk hire. The truth of the matter is that the Fuel Administration paid the salaries of some thirty of the employees attached to the anthracite committee. In view of the fact that dozens of men, with far less worldly goods than have the members of the anthracite committee, made important sacrifices to serve the Fuel Administration, the anthracite committee did not feel justified in charging the Government for office rent when they had ample office room of their own which could be used. By using members of their own office forces, a considerable portion of the clerical work at the committee's headquarters was discharged without cost to the Government, but the committee relied upon the paid employees of the Fuel Administration to conduct the work outside of the headquarters of the committee. Even a portion of that work was done by help employed by the Government.

The criticism that anthracite distribution should be conducted from the Fuel Administration's offices in Washington, as was bituminous distribution, is answered easily. The anthracite industry centers in Philadelphia. Practically all of the producers maintain offices there. All the records pertaining to distribution are easily available at that point. The thousands of orders which it was necessary to issue quickly could be given over the local telephone exchange. To have accomplished the same work in Washington, which would have necessitated a duplication of records and distribution machinery, would have cost the Government dearly. In addition, it would have led to endless trouble and confusion from the fact of its geographical position.

The fact that much of the anthracite moved in normal channels has no untoward significance. By keeping it in these channels, confusion is avoided and efficiency secured. There are hundreds of examples to prove that there was no hesitancy in making changes where it was necessary to accomplish the greatest good.

Government's Maximum Coal Prices May Be Relinquished Before End of Coal Year

Probabilities point to the abandonment of the coal-price schedule before the beginning of the next coal year. It is believed that a period should intervene so as to allow any readjustment which may take place to assert itself. Some are of the opinion that the prices may be abandoned Feb. 1, while others think that Mar. 1 will be a better time to remove the maximum prices. The price schedule, of course, means nothing in many districts, even as it is.

It may be decided to allow the zones to stand after the price schedule has been abandoned. While some are of the opinion that prices and zones are interdependent, the majority view is that they are not. The need for transportation continues great, and since the zones have been responsible for increasing the car supply by a considerable per cent., it is argued that the barriers should be kept up for some time to come.

New Zone Changes Enlarge Fields to Which Soft Coal May Be Shipped

Two new zone modification orders, permitting the further shipment of bituminous coal from parts of West Virginia, Maryland and Pennsylvania and into sections of Maryland, the District of Columbia and New England, were made public on Dec. 24 by the United States Fuel Administration.

One order, modifying Bituminous Coal Zone P-1, permits the all-rail shipment of bituminous coal on the Baltimore & Ohio, the Western Maryland and the Coal & Coke railroads in West Virginia, Maryland and Pennsylvania to all points in New England.

The other order, modifying Bituminous Coal Zone P-2, provides for the shipment of bituminous coal from all districts of Pennsylvania to Baltimore and vicinity and to the District of Columbia.

Sweden Offers Permanent Market for American Coal

A cablegram from the American consul general at Stockholm, Sweden, says that, according to a report made by the largest coal importers in Stockholm, there is an unusual market for American coal and that permanency of trade is promised.

Special Fuel Commission Returns from Tour of Investigation Abroad

The Special Commission of the United States Fuel Administration, consisting of Walter E. Hope, S. Brinckerhoff Thorne and James H. Allport, sent abroad to study fuel conditions, returned on the Cunard liner "Mauretania" on Monday of this week. The commission spent two months investigating the fuel situation in France, England and Italy, and before sailing from abroad made a report to President Wilson.

In a cablegram received by Dr. Garfield on Nov. 25 from the members of the Commission, the damage done by the Germans to the coal mines at Lens, France, was said to be so great that production cannot be resumed for periods ranging from eight months to three years.

Mr. Hope joined the Fuel Administration forces in September, 1917, as Director of the Bureau of State Organizations, and was mentioned for appointment as State Fuel Administrator of New York when Albert H. Wiggin resigned early last summer; Mr. Thorne is president of the Temple Coal Co., and of Thorne, Neale & Co.; Mr. Allport is a consulting engineer.

The members of the Commission stated upon their arrival here that before the war England had mined 287,000,000 tons of coal a year, and that last year but 230,000,000 tons of coal had been mined. The situation in France and Italy they said was serious. The members of the Commission also stated that England is releasing 5000 coal miners from the army each day so that they can return to the mines.

May Be a Market in France for Large Tonnage of American Coal

Shortage of coal throughout Europe will make it possible for the United States to have that coal market during 1919, according to information reaching the Department of Commerce. The Department's representative in Paris is authority for the following discussion of the situation in France:

The post-war position of France with respect to coal supplies may make it possible to sell American coal in France during the year 1919. However, until there is some certainty regarding ocean freight rates, it is impossible to say whether American coal can compete with English coal delivered f.o.b. French ports.

Before the war the annual consumption of coal in France was over 60,000,000 tons, of which 40,000,000 tons were produced in the country. It is estimated that the consumption of France proper during 1919 will be in the neighborhood of 55,000,000 tons. Allowance is made in this figure for the reduced consumption of coal by reason of the destruction of thousands of manufacturing plants in the north of France. To this figure should be added, however, 8,000,000 tons, which is the quantity of coal required to feed the iron, steel and textile industries of Alsace-Lorraine, now in French occupation. This makes a total estimated consumption for France of 63,000,000 tons for the year 1919, or about the same as before the war.

It is hoped that French mines during the year 1919 will produce at least 30,000,000 tons of coal. This is slightly in excess of the quantity of coal mined in the year 1917. While there may be a slightly greater production for the year, as mines in the devastated regions gradually resume operations, it must be remembered that the labor needed to mine this coal will in all probability have to be taken from mines in the center of France, with a consequent reduction in the output of that section. There is also included in this estimate of 30,000,000 tons the coal that will be obtained from that portion of the Saar Basin lying in Alsace-Lorraine. The remaining 33,000,000 tons must be imported.

France hopes that England will be in position to export hither during 1919 close to 15,000,000 tons of coal. It is also expected that approximately the same quantity of coal can be imported from Germany during the year. However, if England is not able to export this quantity of coal to France next year, and if conditions in Germany should be such that a corresponding quantity cannot be delivered to France, the French will have to look to the United States for whatever quantity is still lacking. Under the circumstances, it might be worth while for American coal exporters to look into the French situation a little in order to be in position to assist France in case of necessity.

District of Columbia Fuel Administrator Explains Coal-Storing Order

In reply to the request of the Senate for information as to the authority on which he issued his storing-coal order, the Fuel Administrator of the District of Columbia stated:

Upon the issuance of the order referred to the same was given wide publicity through the newspapers of the District of Columbia, and up to the present time there has not been called to the attention of the Fuel Administration any violation of the same by any of the retail dealers in said district. Said order was issued under the authority of the so-called "Food and Fuel Control Act," approved by the President Aug. 10, 1917, which, as I am advised, authorizes the President through the agency of the United States Fuel Administration, to fix the price of coal wherever and whenever sold either by producer or dealer, and to establish rules for the regulation of and to regulate the method of production, sale, shipment, distribution, apportionment, or storage thereof among dealers and consumers.

The order, which apparently does not meet the approval of the Senate, reads as follows:

In order to prohibit the excessive charges heretofore demanded by individuals for the storing of coal in customers' bins, it is hereby ordered by the Director for the District of Columbia, United States Fuel Administration, that on and after this date no person shall charge a sum greater than 75c. per ton for the storing of coal. All retail coal dealers are hereby directed from this day to arrange for and store all coal delivered by them to residences whenever requested by the purchaser, at a cost not to exceed 75c. per ton.

United States Coal and Coke Exports During October

An analysis of the exports of anthracite and bituminous coal and coke during October, 1918, made by the Statistical Division of the Bureau of Foreign and Domestic Commerce, will be found on the last page of the market department in this issue.

All restrictions on the sale and delivery of coke for export were removed by the Fuel Administration as of Dec. 24.

THE LABOR SITUATION

EDITED BY R. DAWSON HALL

General Labor Review

All is not well with the union in the anthracite region. While the operators are getting reconciled to the chastening of the union the mine workers are rising in rebellion against its discipline and rebukes. Of the 170,000 men in the anthracite region, probably barely one-half are now in the union. And many that are in seem to value membership mostly for the opportunity it gives for factional fights. Membership has all the appeal and furnishes all the opportunity of the celebrated Donnybrook fair; only be it remembered times have changed since that celebrated fair was suppressed in 1855. Eloquence and the rules of debate have almost entirely replaced as modes of action physical strength and the rules of effective shillalahing.

John T. (Jack) Dempsey, of Scranton, is, as said last week, no longer district president of No. 1 District. He was charged with several undue abstentions from his duties. At the time the charge was made, he was suffering from influenza. Nevertheless, Joseph Yanis, of Pittston, the vice president, was placed in the presidential chair. The miners regarded the frequent absences of Jack Dempsey as occurring for a less well justified reason than could be furnished by the grippe.

COMPANY GRIEVANCE COMMITTEES RECOGNIZED

At last the union is recognizing the formation of company grievance committees, those *imperia in imperium* which they have long dreaded in District No. 1. The employees of a large company form themselves into a super local, and they can readily sway the affairs of a whole union district. "Divide and rule" was at one time, and in places still is, the rule of the operator. "I deal with my men unorganized," says the operator. "I deal with the locals unorganized," similarly says the union. "Divide and rule." The Delaware, Lackawanna and Western R.R. Co. Coal Department's employees have already succeeded in establishing such a company organization. Now the Delaware & Hudson Co. mine workers have formed, under the direction of the executive board, a general grievance committee which will represent all the employees of the company. The union attitude has evidently changed, or has had to change, under pressure from within the union. The new grievance-committee chairmen will doubtless often find themselves in conflict with the district presidents. But the board of District No. 1 is committed to the new order, and a campaign will be inaugurated to form such general grievance committees for all company operations.

COMPANY COMMITTEES MAY PERHAPS DO GOOD WORK

No one knows what this will portend. The grievance committee may conceivably be able to do a great deal to pacify unreasonable locals. The heads of the large grievance committees may well be men who will acquire large vision, just as the district presidents soon do. Formed in opposition to the union and to combat its rulings, they might work immense harm to its authority and influence. Formed by the union they may be immensely helpful to that organization.

A meeting, to prepare the way for the new company grievance committee, was held recently, the district executive board and representatives of 18 locals of the Delaware & Hudson Co. being present. There were only three locals that were not represented.

On Dec. 21, 2000 mine workers of the Storrs and Diamond collieries of the Delaware, Lackawanna & Western R.R., Coal Department, went on strike because their payday was not advanced so as to permit them to do their Christmas shopping sufficiently early. The men had served a notice on the company some time ago that they would not work if they were not paid on the Saturday preceding Christmas Day. When a bulletin notice was posted on Friday to the effect that payment would be made on Monday they prepared to go on strike on the day following. On Monday, Dec. 23, the men were paid according to schedule and accordingly they returned to work Dec. 24.

WEST VIRGINIA TROUBLES ARE BEING COMPOSED

Generally speaking, labor troubles are at a minimum just at the present time in West Virginia, although two strikes of a rather serious nature have just been settled or are approaching settlement. It is quite generally thought that there will be no serious disagreements before spring and there will probably be none even then. President Keeney of District 17 has repeatedly stated, both publicly and privately, that the treatment accorded officials and men of the mine workers' organization in the Fairmont region is in every way conducive to friendly relations, every consideration having been shown the miners. In that region at any rate controversies are unlikely to arise in the near future. Many meetings of miners are being held throughout the Fairmont region, but such meetings have to do with details of organization and with other matters concerning the union administration.

There are signs of growing unrest in the Illinois fields, due to the stop which was put to the miners' remarkable prosperity by the signing of the armistice. With mines in the Standard field operating only a day or two a week and those in the Mt. Olive district not doing much better and a general slackening through Central Illinois, and the Carterville district not working more than four days a week, the indications are that the miners will soon be asking another increase in wages. True, they have a joint agreement with the operators, which runs until April, but that has been broken a couple of times and may again prove to be only a scrap of paper. Cutting of prices by the operators is placing a weapon in the hands of the miners, who say that if the operators can afford to make such reductions in price they can also afford to pay more wages.

Coal production in Central Illinois was considerably curtailed recently by a street-car strike which tied up the Illinois Traction System, which traverses the field. The miners who depended upon the traction company for transportation to and from the mines were unable to get to work. But this was not the only trouble, for the traction company does a big coal-hauling business. Many of the mines in the Springfield section, particularly some of the small ones, depend entirely upon the traction company for the hauling of their output. Others are dependent upon the company for transportation of supplies necessary for operation. When the cars stopped running the mines had to close down. The strike has been settled and the line is again in operation.

ILLINOIS MINES ARE RUNNING IRREGULARLY

Independently of the traction strike, there was a marked falling off in employment at the mines in Illinois in November, caused by the influenza in mining towns, the overstocked condition of railroad coal bins, factories, stores, public institutions and residences, by the modifying of Government fuel orders and by the slump in war work.

The mine workers' election is stirring up much trouble in Illinois. John H. Walker, candidate for international president of the United Mine Workers, and Freeman Thompson, president of the Springfield subdistrict, have issued statements charging that there has been tampering with the election machinery, which tampering has gone the length, Thompson says, of stealing and altering ballots.

EDITORIALS

La Ingenieria Internacional

REALIZING the value of internationally exchanging information regarding engineering ideas and accomplishments, the McGraw-Hill Co. on Mar. 1 will begin the publication of a magazine devoted to that purpose. The publishers expect eventually to publish editions in several languages, but the first issue, being planned for circulation in Latin America and Spain, will be published in Spanish and will be known as "La Ingenieria Internacional."

The publication of this new magazine has been under consideration for some years. Its purpose is to afford a medium for the presentation of those developments in American engineering which may be of value to engineers, contractors and manufacturers in other lands. At the same time, following the practice of the present McGraw-Hill publications, a far-flung editorial organization will be developed that will draw into the paper the best of engineering practice in Latin America, in Spain and in other countries where Spanish is spoken. Aside from its performing this function, the new magazine will greatly develop international goodwill and will be a medium whereby American manufacturers engaging in export trade can carry their message to prospective buyers in foreign lands.

It may be a cause of surprise that the McGraw-Hill Co., whose specialized papers circulate so widely overseas, should establish a magazine to serve the foreign field. The reason, however, is not hard to find. The present highly specialized papers appeal only to those who are situated where engineering enterprise has made such progress that there is room for the specialist and need for the last refinement in equipment and design. But everywhere the world over are territories newly developing, where the engineer, the contractor and the manufacturer must each turn his hand to many lines. It is to serve the general practitioner so situated that the new magazine, and its later companions in other languages, will be started. The specialized papers in English will still hold their place as the recorders of the best in the advanced practice of American engineering.

Now the Tune Changes

DURING the war the call came for a large tonnage with only a few men available. Now we are seeking rather low cost and high quality. While the conflict lasted we ushered out, alas too often, the man who promised us less coal breakage and a better prepared coal. He comes back now with a stronger plea, and the promise that quality will assure the operator of steadier work.

But principally does high cost of operation perplex us. No longer are we able to say that every ton of coal, however expensive, will add to our earnings. All that is mined must be cheaply mined, and only by a generous use of machinery can that end be accomplished. We now have time to install these devices. When the stress of conflict and the daily round of work confronted us, we had no time, labor or material to build nor moments or inclination to contrive. It is different now, and like prudent captains of industry we have sensed and evaluated that difference.

The pernicious cost sheet, now again enthroned, demands hourly consideration, and its perusal sharpens our wits and makes keener than during the war our search for ways and means of reducing the unnecessary employment of labor. We cease tabulating our tonnages, and we commence again to chart our costs, for perhaps they will count as much as 90 per cent. of all considerations, toward the close of the coming year. We are already beginning to fear that a large tonnage will soon only serve to make us money by keeping down the cost per ton. Dextrous we have been in increasing output; we shall not fail when our work is the decreasing of costs and the improving of product.

States' Rights and Mining Education

ILLITERACY in the United States reaches a higher percentage figure than in any other of the great nations of the world. We pride ourselves on our school system, and on the whole we have good reason; for, averaging conditions, we have schools that will show most favorable comparison with those of any other nation. Our city schools and most of our rural schools surpass those in other countries. But there are other schools, a few of them in mining communities, that are a discredit to our high standard.

The trouble is that our schools are under local control and supported largely or wholly by local finance. The result is that the school boards are typical of the communities they represent. If those communities have no education, they desire none for their children; and if they have little literacy they are anxious to expend but little on the training and development of their youngsters.

As a result, while a cultured community readily sustains good schools, any community that is but little educated has poor schools and often, when seeking teachers, calls on the graduate scholars of these same schools, without any outside training, to take up that burden. The schools therefore tend to get less efficient rather than more efficient year by year. Nepotism is rife. The schools are filled with "the sisters, the cousins and the aunts"—to say nothing of the daughters—of the school directors.

Some improvements have arisen from state interference. In areas with arrested development, or where the educational status has even moved backward, the school management is being toned up by the action of the state boards of education. Still the progress is

slow and halting. The political control in some states is deplorable. In some others the interest of the whole state population in education is only lukewarm.

As a result we have areas of some states that are unsafe for citizens of long residence and positively dangerous, even deadly, for outside strangers such as coal operators and their agents, however honest and even helpful may be their intent. More education that will open the eyes of the people in these remote districts to the fact that matters are better handled elsewhere is badly needed. So long as the people are ignorant they will make poor mechanics and even poor laborers. They will continue to be suspicious and clannish, and their first thought will be of secret violence and not of mediation and discussion.

Not only that. So long as rural communities are content with inefficient schools for the native-born, there will be no night schools for our foreign workmen. Americanization may go ahead—in the courts—but will stand still in the hearts and the homes of the foreign-born. The foreigner will remain a foreigner, though in his hand he may hold a gaudy piece of paper—a certificate of naturalization—that will in no way direct and guide his life. It will give him the power to wreck our governmental machine; it will not prove that he possesses, nor will it grant him, the ability to run it.

The condition is made the more deplorable because the burden of better education in a mine village falls largely on the operator. If he is progressive and forces the local officials to become active and provide good schooling, he has to pay the greater part of the bill out of his dividends. It is right that he should, but it is not right that while the operator in one place pays this heavy tax the operator in another place is permitted not to do it because the people in that particular community are too ignorant to call for such an expenditure. The result of the discrimination is that the man who has good schools at his mine village is by that fact, at a period of close competition, apt to find it harder to run his mine than his neighbor finds it where adequate schools are not being built and, when built, are not being properly sustained.

No wonder that there is talk of turning the matter over to the Nation, as is the practice abroad. The Federal authorities would then have directive power. The help to the local schools would be evenly distributed, not only between operators in one state but between operators the Union over. All the mechanical aids that contribute to successful teaching could be put into every school. Films and phonographs would teach English, mining, safety, history and hygiene, and wonderful would be the results.

But there is a "nigger in the woodpile" in regard to national assistance to local education. And that "nigger" is the negro. Federal authorities will stress racial coeducation to its last consequences, while certain states will emphasize the sacred right to resist the mixing of white and black. National assistance, if given, will be predicated on a disregard of the color line. As a result the states with colored folk—the most backward of any and the most needful of help—will refuse the Federal aid. There will be no bettering of conditions where betterment is most needed.

The outcome, if Federal assistance is provided, will be that the states where education is needed most will pay for the education of those where it already is most generously supplied, and the states which already have good educational establishments will pay nothing to those that have only indifferent schools.

Federal aid is thus unlikely and perhaps undesirable. The states' desire for "self-determination" will, as often before, work to their individual disadvantage. Yet there does not seem any other solution of the problem than state control and state support of local education. All we can hope is that the states which have done badly in the past can be induced by educational propaganda to take heed to their ways and to do better hereafter, thus spreading enlightenment into the Nation's darkest corners, and lightening the financial burden resting on any individual by the fact that all must bear a like impost no matter where their operations may happen to be located.

Why Not Attack the Big Items?

NIBBLING is characteristic of mice rather than of men. When therefore you look over your cost sheet, as you may have occasion to do many times during the coming year, do not figure on the way in which you can nibble at the small items but how you can bite deep into, and divide in two or three, the costs of the larger items, namely, loading and mining coal.

If you are content merely to nibble at the smaller charges, you may gain therefrom some sustenance but not a full meal. The big items are those which are not under day-labor rates but under a tonnage schedule. For years you have left them alone. You reasoned that they were irrevocable, but since the war you have learned how tonnage per man could be increased if only you were willing to put a little more into the other costs and to put a little faith into your business, relying on greater production to prevent those other costs from increasing per ton when they were increased per plant.

One reason for low production has been a fear on the part of the miner that the rate per ton would be lowered if he put out a large tonnage or yardage. Another has been that the operator did not back his men with adequate power, equipment and supervision. He pared the variable costs to the quick and thus coöperated so poorly with the miner that, despite the fair and even generous tonnage rate, the miner could not hope to make a good living.

Mine coal by the day and back up the miner by the support of everyone—the superintendent, the foreman, the driver, the tracklayer, the bratticeman, the pumper, the blacksmith, the car repairer, the dumper and the trimmer, and see if, while paying a good day wage to the mining force, a large reduction cannot be made in the loading cost. Even more; put in every loading device that will increase individual output. Accept the coal loose in the car and not methodically built up: if coal is not topped so generously less will be spilt on the road.

Of course, this day-wage plan cannot be started when work is good and men are scarce and little disposed to work steadily and industriously. But when the tonnage wage appears likely to be inadequate and steady work impossible under a day wage, your men may favor the change and the scale may be made generous enough to make them render you not merely compliance but generous coöperation.

DISCUSSION BY READERS

Wage Adjustment

Letter No. 2.—Since reading the interesting letter of W. E. Joyce, on the subject of wage adjustment following the cessation of the war in Europe, *Coal Age*, Oct. 17, p. 752, I had hoped to see a further expression of opinion from readers in this regard.

It is my belief that wages will decline when the peace treaties have been signed, although I do not think they will return to what they were in 1914, the year that the war started. Personally, I have little faith in the hope that there will be such an adjustment of wages as referred to in the letter of Mr. Joyce.

The chief reason for the low state of wages before the war is to be found in the fact that European labor coming to this country was cheap. It is true that these immigrants were paid more, here, for their labor than they had received in their own country where the wages were low and the cost of living was correspondingly small.

To illustrate my thought, let me say that, about 1913, I saw an account in a newspaper of a German mechanic, who had been getting $2 a day in Germany. On coming to this country, however, he was paid $4.50 a day for his labor. He stated that, at home in Germany, he could save money, but here it took all he could make to live. He did not explain why that was the case. It may be that he incurred unnecessary expenses, wasted his money, or lived at a higher rate than that to which he had been accustomed at home.

Again, I know of a man who is making $6 a day, here in Canada. He tells me that, for the same work in New York, he would receive $10 a day; but says it takes more to live in America than in Canada.

Reasons for High Cost of Living

It is, of course, hard to give a good reason for the higher cost of living in one place than in another. It seems to me that the increase of large cities, such as are found in the United States, and the relative scarcity of food-stuffs and other necessary supplies, are largely responsible for the high cost of living. When it costs more for men to live it is natural that they should demand higher wages.

In an address, not long since, President Wilson stated before the American Federation of Labor that "nothing should be done to interrupt labor." He emphasized the fact that strikes and lockouts are as great a disadvantage to labor as to operators, and he is correct. However, it is often quite impossible to satisfy labor, whose demands are generally based on the knowledge that industry cannot go on without their aid.

It is hard to tell to what extent wages may decline, or whether they will decline now that the war is ended. Many people think that business will be dull for some time and that labor will be scarce, owing to the work of reconstruction in France and Belgium, but the scarcity of labor in this country and the export of material and supplies for the work of reconstruction should make business good here.

On the other hand, when peace terms have finally been settled, many things will happen to reduce wages here. The return of men from the front and the closing down of munitions factories will throw many out of employment and no one can foretell the ultimate effect.

Rawdon, Canada. C. McMANIMAN.

Ventilating Power Excessive

Letter No. 1—In an able and interesting article, entitled "Elimination of Power Losses," *Coal Age*, Dec. 5, p. 1021, Graham Bright makes the following statement: "The ventilating system does not lend itself to changes which will improve the load factor. The fan must obviously operate at full speed during the day when there is the greatest demand for other power."

To this statement, some exception may be taken. The fact that the fan motors are constantly running makes them nearly the greatest source of power consumption there is about a mining plant. For instance, at one large company in this state where central power is being used, the fan motors consume 16.2 per cent. of the total horsepower supplied from the power house. They require more power for their operation than the mining machines and are only exceeded by the locomotives, which take 20.2 per cent. of the total consumption. Any saving that can be made in the power required for ventilation will greatly improve the load factor.

Installation of Meters Proved a Revelation

When central power stations were first installed in this state some of the coal companies had meters attached to their different classes of machinery, including their fan motors. The first and second months' readings of the fan-motor meter almost threw the management into a panic. They found that, at some of their mines, it far exceeded all of the other power consumed, both inside and outside of the mines.

With current costing in the neighborhood of 1c. per kw.-hr., and with good producing mines, the ventilating power was costing as much as 7c. per ton of coal mined. The management had been giving the closest attention to the transmission system and the upkeep of machinery; but, the high cost of ventilating power seemed to be something that had escaped their notice, and they now realized that something would have to be done inside of the mines, to reduce the power required for ventilation.

Work was immediately started to put the airways of the mines in such shape that the same or a greater amount of air could be circulated through them with less power. By cleaning up the airways in use, driving additional ones and stopping up leaks, they reduced the charge for ventilating power from 7 to 2 and even 1c. per ton, which was a vast inmprovement.

What Mr. Bright has said about costly transmission losses of power within the mine could well be said of the costly transmission of air within the mines. But, in conclusion, it will not be amiss to advise the operator who uses power, especially if the power bill is rendered from the reading of one main meter, to look with suspicion on his fan motor, it may be consuming more than all of the other motors combined, and let him look for the reason thereof.

Sharples, W. Va. P. A. GRADY.

Freezing of Shaft in Winter

Letter No. 5—Referring to the inquiry of "General Superintendent," *Coal Age*, Nov. 28, p. 1004, it appears to me that he is much like the rat caught in a trap by reason of its taking the bait. When proper provision is made for draining a wet shaft, there should be no difficulty from the shaft freezing in winter; but when this provision has been neglected, one must suffer the consequences. If we stop to compute the expense of from three to five days when the mine must lie idle because of a frozen shaft, the need of providing against such occurrence is apparent.

However, in this case, the trouble is there and must be met at once. As a makeshift, let me suggest that an opening be made in the shaft, at the point where the water enters, and a sump or box be placed there to catch the water, which should then be piped to the bottom of the shaft and pumped to the surface. Or, if the flow of water is not too great, a small pump can be set in., at that point in the shaft, and the water pumped at once to the surface. In any case, care must be taken to drain the column pipe when the pump is not in operation, to avoid the freezing and bursting of the pipe.

EXHAUST STEAM SHOULD BE USED IF AVAILABLE

Where the mine fan is run by steam, it is always a good plan to turn the exhaust steam into the downcast shaft. This plan will often prevent the freezing of a wet shaft, although it presents the disadvantage of filling the shaft with dense clouds of steam. If it is required to make an examination of pipes, steps or ladderways in the shaft, it is necessary, of course, to shut off the steam when so doing.

While these suggestions will probably make it possible to pull through the winter, as soon as suitable weather comes, work should be started on water-rings, constructing them at those points where water enters the shaft, as has already been suggested in the reply to this inquiry. If one can afford the expense, it is a good plan to cement a wet shaft so as to keep out the water. The suggestion of installing steam coils for heating the intake air, and the use of salt or brine to prevent the formation of ice in a shaft are, in my opinion, only makeshifts; and, like the wolf in sheep's clothing, cannot be relied upon when there is the greatest need.

Perryopolis, Penn. R. W. LIGHTBURN.

Letter No. 6.—I read with interest the letter of "General Superintendent," *Coal Age*, Nov. 28, p. 1004, regarding methods of preventing the formation of ice in mine shafts in winter. My experience leads me to think that the comments and calculations made in the reply to this inquiry may, perhaps, prove misleading.

Permit me, then, to give a brief description of the manner in which we have accomplished a double object, by preheating the air entering the downcast. Not only did this prevent the formation of ice in the shaft in winter, which had previously been a source of much trouble, but the method we applied increased the humidity of the mine air to almost 100 per cent.

About four years ago, owing to the mine being considered somewhat fiery, and the return from one split reaching a portion of our old works that was inaccessible and could not be examined, the State Mining Department requested that the circulation in the mine be reversed. The change was made late in the summer and at once set me to thinking what means could be adopted to prevent the freezing of the hoisting shaft, which was now made the downcast for the mine.

Being troubled with ice in this shaft in the winter would mean the loss of many days and parts of days as there was already but slight clearance for the cages. Almost the universal reply to my many inquiries was to the effect that nothing could be done and I must expect to lose one or more hours, of a morning, chopping out the ice in bad weather, and, now and then, it would probably mean the loss of a day, to say nothing of the delay and expense due to broken guides and cages.

My decision was soon made to try out the plan of preheating the air, in a way that I had turned over in my mind many times. In spite of adverse criticism, we proceeded with the plan and met with gratifying success. The first step was to build a small tile house, a photo of which is shown in Fig. 1. The general plan of the house and arrangements of the radiators or heating coils, in respect to the downcast compartment of the hoisting shaft, is shown in Fig. 2.

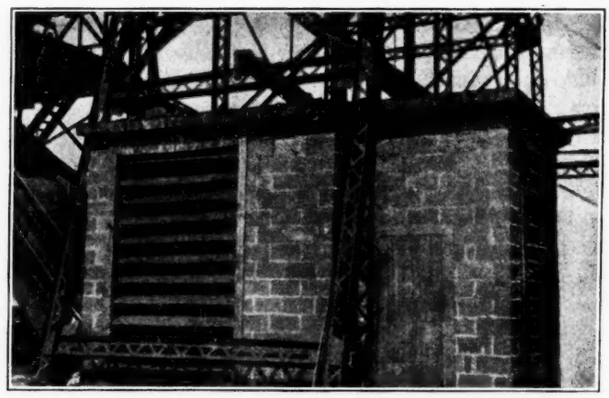


FIG. 1. TILE HOUSE FOR PREHEATING INTAKE AIR

In the same figure is also shown a small detail of the four sets of radiators, each of which consists of four rows of 1-in. pipes, which were staggered as shown in the figure. These pipes were 10 ft. in length and screwed into a base 7 ft. long. The four radiators were set in pairs, one radiator behind the other so that the entering air was forced to pass between eight staggered rows of pipes before it reached the downcast air compartment. The water condensed in the radiators was drained to a trap, which was so arranged that the hot water could be discharged in a spray down the shaft or run off outside to the feed-water heater.

To complete the arrangement, hinged doors were placed over the hoist compartments of the shaft, so

that when these doors were closed all of the air entering the shaft had to pass through the radiators. In cold weather, the doors were closed at 3:45 p. m. and not opened again until 7 a. m. In very severe weather, the doors were also closed during the noon hour. This heating plan is arranged to use either exhaust or live steam, at about 5 lb. pressure. Ordinarily, exhaust steam is available from 3:45 to 11 p. m., but, from 11 p. m. to 7 a. m., live steam is used.

Humidifying the Heated Air Current

By introducing steam or hot water sprayed into the shaft, the heated air current is enabled to take up and carry into the mine from 12 to 15 times more water vapor than would be possible if the air was not heated.

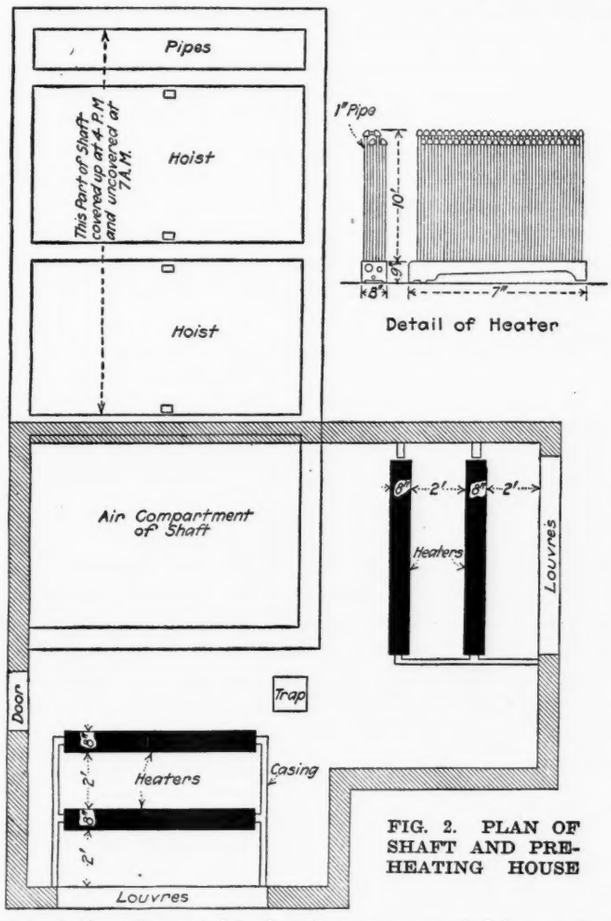


FIG. 2. PLAN OF SHAFT AND PREHEATING HOUSE

Calculating the weight of water vapor carried in a saturated air current of 100,000 cu.ft. per min., we find that, at a temperature of 20 deg. below zero (Fahr.), this current carries 0.385 gal. per min. into the mine. Again, at a temperature of 40 deg. above zero, the same air current fully saturated will carry 5.019 gal. per min. on its way into the mine. A heater and humidifier placed at the fan shaft of a mine would have exhaust steam 24 hr. a day if the fan was steam driven. Our heater is still in operation today, and will probably remain so for the next 20 years.

Before closing, allow me to suggest that the water running into the shaft is materially above the freezing point and must give up its heat units, until it reaches the freezing point and then its latent heat, before it will be changed into ice, which will materially assist in heating the mine air. Of course, wherever possible, exhaust steam should be used, as it is commonly a waste product and contains, roughly, 80 per cent. of the heat in live steam.

MINING ENGINEER.

Cleveland, Ohio.

[As to the suggestion of this correspondent regarding the heat given up by the water draining into a shaft, taking the temperature of ground water at, say 48 deg. F. and the latent heat of ice at 32 deg. F. as 144 B.t.u., the total heat in the water, above 32 deg. F., and given up, per pound of ice formed, is $144 + (48 - 32 = 160$ B.t.u. Then, assuming 10 cars or, say 450 cu.ft. of ice formed in a shaft in 24 hr., which is a bad condition, the total heat given up by the water draining into the shaft and frozen is $(160 \times 450) \div (24 \times 60) = 50$ B.t.u. per min. It will be observed that this amount of heat is quite inconsiderable in comparison with the 56,976 B.t.u. required each minute, in the case described in the inquiry to which this correspondent has referred. (Nov. 28, p. 1004).

In discussing the practicability of the preheating of intake air for the prevention of ice trouble in shafts, it must be remembered that the severe conditions represented in the reply to this inquiry (p. 1004) do not continue ordinarily more than a day or so when the weather will usually moderate. The benefit derived from the preheating of intake air will doubtless then remove the accumulation of ice that is formed during the more severe periods. This will explain the practical benefit to be derived from a properly installed system, such as this correspondent has described.

Regarding the statement that exhaust steam contains 80 per cent. of the heat in live steam, it is worthy of note that, exhausting under a back pressure of, say 3 lb. gage, at sea level, a pound of steam contains 1150 B.t.u., while live steam at 100 lb. gage contains 1185 B.t.u. above 32° F. This shows that the exhaust steam contains $1150 \times 100 \div 1185 = 97$ per cent., instead of 80 per cent. of the heat in the live steam, under the conditions named.—EDITOR.]

Travel of Electric Current

Letter No. 7.—Referring to the question of whether an electric current travels in a conductor through its cross-section or over its surface, permit me to add a word or two from my own practical observation, which seems to support the idea that the current travels throughout every portion of the cross-section and not over the surface of a wire, only.

Like others, I have been told that an electric current is a fluid that travels over the surface of a conductor; but practical observation does not seem to support this theory, and I have come to believe that the entire cross-section of a conductor is as much alive as its surface.

One thing that has led me to this conclusion is the fact that steel rails carrying the return from a direct-current system are rendered brittle, in time, by the electricity passing through them. This brittleness of the metal is equally distributed throughout the cross-section of the rails. They are not brittle on the surface only. I have observed that rails never heat, except at joints that are connected by defective bonds, which would seem to tell the same story.

Again, the insulation of wires conducting electricity would appear to obstruct the flow of any current over the surface of the wire, particularly in the case of the wires of an incandescent lamp where they enter the bulb or globe, and where the insulation is so complete that there is practically no chance for the current to pass over the surface of the wire. To my mind, these practical facts seem to demonstrate that the entire cross-section of a conductor is alive. Indeed, I can see it in no other way.

Thomas, W. Va. W. H. NOONE.

Locating the Coal Beyond a Fault

Letter No. 4.—Having had some considerable experience with faults in coal seams, and finding these in different shapes, some upthrows and some downthrows, it may be that I can offer a little suggestion that will be helpful to the inquirer in *Coal Age*, Oct. 24, p. 797. Where we have met these faults, I have always been successful in tracing and finding the seams, although I have not undertaken to sink boreholes from the surface or in the seam, for that purpose.

Let me say that the advice given in the editorial note following this inquiry is quite correct in stating that this fault is "apparently a downthrown." The two boreholes sunk from the surface, if estimated correctly, should afford the means of ascertaining the amount of the dislocation. However, it should be remembered that if the original seam is rising on a 4 per cent. grade, allowance must be made for this, as the seam would have risen 16 ft. in going the 400 ft. to the first borehole, had the fault not occurred.

EFFECT PRODUCED IN FAULTED STRATA

The thickness of the coal beyond a fault will often be found to be quite variable, for a time. This fact will often prove misleading when one judges the continuation of the seam from its thickness. In the case cited, it is very probable that the 3 ft. 9 in. of coal found in the borehole corresponds to the 4 ft. of coal in the X seam, at the fault.

The method that I have pursued in tracing the coal beyond a fault is to study carefully and observe closely the slip of the strata, at the fault. It will generally be found that there is a small leader of coal, which, if followed, will prove a sure guide to the lost seam. Such has been my experience many times. In following this lead of coal, I have always driven as small a place as could be conveinently worked, and enlarged this after finding the coal. This small opening may have to be abandoned and another driven that will afford a better grade for hauling the coal, but that can only be determined after the seam has been located beyond the fault.

Before closing, let me suggest that if this fault proves, as expected, to be a downthrow, it may be found more economical to work the X seam, beyond the fault, through the original Y seam, as these two beds of coal will more nearly correspond in elevation, at the line of fault and can be connected by a short rock tunnel.

Worley, Ky. JOSEPH CAIN.

Letter No. 5.—As superintendent of a small mine, I have often been desirous of gaining outside suggestions, in regard to the many difficulties one meets in mining coal. I realize that this is the desire of the superintendent who inquires the best means of mining the coal cut out by a fault in his mine.

Allow me to make one simple suggestion, which is as follows: In my opinion, it would be well to start a borehole in the roof of the X seam about 10 or 20 ft. beyond the fault. Incline the borehole upward at an angle corresponding to the fault line. Do the same in the floor of the seam, sinking another hole downward in a sloping direction corresponding to the fault. Whether the seam is an upthrow or a downthrow, these boreholes should be able to find the coal, sooner or later.

Manorville, Penn. W. N. R. C.

Letter No. 6.—I have always been interested in studying the mechanical forces that have operated in producing a fault or dislocation of the strata. By a close study of the force that has caused the disturbance, in any particular case, and by applying a few theoretical principles, I have been able to correctly determine the nature of many different faults in practice.

In the case described in the inquiry in *Coal Age*, Oct. 24, p. 797, I was first tempted to agree with the suggestion that this is a "downthrow." However, taking into consideration the 4 per cent. grade of the seam, and the probable pitch or inclination of the fault or slip, I concluded this might prove to be an upthrow.

Since the first borehole is located in a sag in the surface, there is undoubtedly a downthrow between the face of the heading and that borehole. I fully agree with the idea expressed that the coal sunk in that hole belongs to the X seam, and believe that its thickness has been reduced by the pressure caused by the dislocation and movement of the strata.

There are three different ways in which strata may be faulted: (1) One part or section of strata may slip down on the other part or section. (2) Owing to extreme pressure, one part may be thrust up and over, or down and under, another portion of the strata. Again, (3) the strata may be folded, one section being completely overturned on another.

NEED TO CAREFULLY STUDY THE FORMATIONS

One could form a better judgment if he had a typographical map of the country and a correct profile or cross-section. This mine being a drift opening suggests a hilly country, which would enable a good study to be made of the formations, and that would be a great help in determining the character of the fault.

Where a fault line corresponds to the strike of the seam, besides the vertical there is a horizontal movement plainly evident; but when the fault line crosses the strike, it gives greater force to the horizontal movement. This will depend on the inclination of the strike and the pitch of the fault. These are always to me helpful considerations in determining the character of a fault.

My advice is that the two boreholes should have been carried deeper and the borings made with a diamond drill that would have enabled the study of the cores or sections of the strata taken from the holes. Should the two holes fail to give satisfaction, it would be well to prospect further on the fault line; but before doing so, it would be my plan to make a careful survey of the fault to determine its strike and inclination with re-

spect to the seam. By doing this, much needless expense may be avoided.

I recall an instance where thousands of dollars were expended in an attempt to determine a fault at Aguilar, Colo. The work done resulted only in tapping a number of gas and water feeders, without giving any idea of the nature of the fault.

In the present case, it would appear from the plan given in this inquiry that the strike line on the east of the main heading runs, approximately, with the strike of the seam and appears to have a rather steep pitch. On the west of the main heading the fault appears to traverse the strike of the seam at an acute angle and have a somewhat less pitch.

Judging from these facts, if correct, I would say the prospecting should be done on the main heading or at some point east of the same. The carrying out of these suggestions, however, should be done only after careful consideration by the officials on the ground. To give advice, in this case, is somewhat like a surgeon attempting to perform an operation without a strict diagnosing of the case. On no account, however, should the mine be abandoned unless it is known to be at the extreme edge of the coal measures. HENRY BOCK.

Carlinville, Ill.

Perplexities of Mine Foremen

Letter No. 6—Speaking of the perplexities of mine foremen, I am led to ask, Why! Does he have any? You would think not, from the miner's point of view. Even some mine superintendents seem to think that a mine foreman is the most ease-loving, care-free individual in existence.

I well remember my surprise when on my way to the pump and opening a door leading to a side heading I came suddenly on a gathering of almost every worker in the mine. They were holding a mass meeting and I was an intruder.

In response to my query if there was anything that I could do for them, I was informed that there was not; they just wanted to bring that d—— superintendent to time. A few of the men only were talking, as is usually the case, and I stopped and reasoned with them, and succeeded in inducing them to go to work.

Having but recently come to this mine, I was interested in acquainting myself with the prevailing habits of the men and soon found that their regular meeting place was where I had found them. It did not take me long to seek out the mine committee and inform them that they were violating the rules, which they well knew. They promised not to hold another meeting during working hours or in the mine.

At another time, I had been up the main road assisting in clearing away a wreck and, on coming down through a side entry, met a number of men coming out. I asked them quickly "What is the trouble?" They informed me that "Joe had ordered a pair of rails, yesterday, and they had not been put in yet, at 10 o'clock in the morning." With all my persuasion, I could not induce the men to go back.

The situation was about as follows: The motorman and his helper were obliged to shift their empty trip before they could pull out the loaded cars. This bunch of men had loaded their empties, which had been placed the night before. On the arrival of the first empty trip that morning, the needed rails not being in place, trouble arose and the men agreed to quit work until the rails were laid, which they did.

DELAY IN REPAIRING CARS CAUSES TROUBLE

Another instance illustrating a foreman's perplexities is the following: The brakes on the cars were getting worn, so that they would not hold a trip on the steepest grade. I had talked to the superintendent several times about getting the lumber needed to repair the cars. He never broke my heart by his answer, but always promised to order it at once.

One morning I was up the third left heading and, meeting one of the drivers who did not belong in that part of the mine, I asked him what he was doing over there. He replied that he was notifying the men of a meeting outside. "Why," I asked, "what is wrong now?" "Well," he said, "Dick has hurt his mule and the men refuse to work till the brakes are repaired."

I hastened outside, where I found most of the men who had already quit and others were coming. Going at once to the telephone, I called up the office and was informed that the superintendent was then on his way to the mine. I reported this to the men, stating that he would be there shortly.

Before the superintendent's arrival, I had quite a talk with the men, telling them of my conversations with our boss and how he had promised me that he would get the lumber needed to repair the cars. I ventured the suggestion that, "Possibly, it is hard for him to get the kind of lumber needed." The men replied, "This is the only d—— way we can get anything done here, so we won't work another stroke until the cars are repaired."

THE INEFFICIENCY OF THE SUPERINTENDENT

After waiting a half-hour or more, the men became restless and wanted to go home. I urged them to wait a little longer and again called up the office, believing that if I could hold the men until the superintendent came he would be able to satisfy them and they would return to work. Again, I called the office only to be told that the superintendent was not in. The manager was there, however, and wanted to know if he could do anything for me.

I explained to him, as best I could, what the trouble was and gave him a full account of the promises that had been made to the men, adding that they had now quit and would not return to work, until the cars were repaired. The committee had come into the office in the meantime and heard what I said over the phone. They asked me, "Who were you talking to?" adding, "That is right, and every word of it is true."

The superintendent turned up about 3 o'clock that afternoon. When he was told that the men had all gone home, he became very indignant and swore he would get even with them. It is needless to say that the cars were repaired in a few days and the men then went back to work. It is true, I believe, that some mine foremen are easily annoyed, and it does not take much to perplex them. However, there are perplexities, at times, that would try the patience of a Job.

Osceola Mills, Penn. S. D. HAINLEY.

INQUIRIES OF GENERAL INTEREST

Drawing Pillars in Machine Mining

We are operating Sullivan shortwall machines, in a flat seam where the coal is from four and one-half to five feet thick, on the room-and-pillar system. The rooms are driven 27 ft. wide and 250 ft. long. The roof is composed of a strong sandstone and the burden over the present workings is about 200 ft. Since installing the machines, we have not attempted to draw any pillars but wish to do so shortly.

If some of the many practical readers of *Coal Age* would give us the benefit of their experience in drawing pillars with this type of machine, the information would be much appreciated. OPERATOR.

Drumheller, Alta., Canada.

Coal Age is pleased to present these practical inquiries to its readers, as they offer good food for discussion and always bring a ready response. Inquirers, however, so frequently fail to give some of the essential data without which it is impossible to give a wholly intelligent answer to the question asked.

In the proposition submitted above, it is most important to know the width of the room pillars, or the distance between room centers, from which the thickness of the pillars can be calculated. It is possible, of course, to assume a two-thirds extraction of the coal, in the first working, or take the width of pillars as, say 4 or 5 yd.; but this may not even approximate the actual condition existing in these workings.

We shall be glad to hear what our practical readers have to suggest, in respect to the use of the shortwall machines, in drawing back the pillars in this mine. The principal factor to be considered, aside from the width of the pillars is the effect of a hard sandstone roof. One must, also, assume a fair bottom and moderate hardness of the coal.

Gravity-Plane Haulage

We contemplate constructing a gravity plane at our mine, for the purpose of lowering the loaded mine cars from the mouth of the mine to the tipple. The length of the incline will be 5500 ft., from the knuckle to the foot of the plane, which will have a uniform grade of 20 per cent. The average weight of the mine cars is 1500 lb. and the capacity 2600 lb. of coal.

We would like to ask if this is a practical scheme and if it would be possible to handle 25-car trips with safety on such a plane. We shall appreciate seeing the question of gravity-plane haulage discussed by *Coal Age* readers who have such planes in operation.

Hooversville, Penn. SUPERINTENDENT.

The successful and safe operation of a gravity plane depends on many factors that enter the problem and must be carefully ascertained before attempting such an installation. Briefly described, the equipment consists of a substantial frame carrying two grooved head sheaves set tandem to each other and controlled by a strong brake.

The haulage rope must be strong enough to stop and hold the descending loaded trip, at any point on the incline. The brake, also, must be capable of exerting sufficient force to effect the same result. The plane should be a straight line, from top to bottom. The main portion should have a uniform grade; but this must be slightly increased at the top and decreased at the bottom, for short distances, to assist the starting and stopping of the trips.

In the operation of a gravity plane, the force producing motion is the gravity pull of the unbalanced load, which constantly increases as the loaded trip descends the incline and the rope is transferred from the upgrade to the downgrade side of the plane. The forces resisting motion are the gravity pull of the rope on the upgrade and the friction of the entire moving system.

There being an equal number of ascending empty and descending loaded cars, the calculation of a gravity system is based on two ratios of live to dead load. For example, the ratio r is the weight of coal (w_c) in a single car, to the weight of two cars ($2W$), one empty and one loaded; or $r = w_c/2W$, and the ratio r_1, the weight per foot of rope (w_r) multiplied by the length of plane (l), to the weight of two cars ($2W$); or $r_1 = w_r l/2W$.

An important factor in the determination is the resistance to the entire moving system, which is best estimated in pounds per ton, expressed as a decimal. Much will depend on whether the cars are equipped with plain or roller bearings and the friction of drum and rope bearings. This resistance, assuming 20 lb. per ton is $R = 0.01$.

The number (n) of cars that will operate successfully on gravity plane when the percentage (J) of grade is expressed decimally is calculated by the formula,

$$n = \frac{r_1(J + R)}{r(J - R) - R}$$

In the present case, assuming a 1⅛-in. rope weighing 2 lb. per foot, we have

$$r = \frac{w_c}{2W} = \frac{2600}{2 \times 1500} = 0.867 \quad r_1 = \frac{w_r l}{2W} = \frac{2 \times 5500}{2 \times 1500} = 3.667$$

Then, substituting the values in the formula for finding the number of cars hauled in a trip, gives

$$n = \frac{3.667(0.20 + 0.01)}{0.867(0.20 - 0.01) - 0.01} = \frac{2.31}{0.484} = 5+ \text{ cars}$$

Under these assumed conditions, it does not appear practicable or possible to handle 25-car trips on this incline, without the use of a "barney" to counterbalance the weight of the descending loaded trip, and whose weight will yet be sufficient to draw up the trip of the same number of empty cars. We shall be glad to receive the views of others and learn of their experience.

EXAMINATION QUESTIONS

Miscellaneous Questions

(Answered by Request)

Ques.—Describe the various methods of propping and timbering slopes, gangways and chambers, in anthracite mines.

Ans.—In anthracite practice, the conditions of roof, floor and coal are quite variable, and these, alone, determine the method of timbering that should be adopted in any case. There is little difference in the timbering of a flat slope and that of a gangway, for the same conditions of roof and floor, except that timbers set in a slope should be inclined slightly up the pitch, similar to the undersetting of posts in inclined seams. On steep pitches where the track has a tendency to slip downhill, occasional long timbers should be used for track ties and hitched into the ribs on either side of the slope, so as to give the necessary support to the track and keep it from slipping.

Except where the seam is overlaid by an exceptionally sound roof, double timbers are set on all slopes and gangways. A double-timber set consists of a good cross-beam or collar supported on two legs, which are notched into the collar, the whole forming what is called a "timber-set." These timber-sets are placed at suitable distances apart, depending on the nature of the roof and floor. Where the roof is very frail, lagging of smaller timbers is used to span the space between the sets, thus giving additional support to the roof. Or, at times, the timber sets are stood close together, which is called "skin-to-skin" timbering.

Where the coal is exceptionally hard and overlaid with a fair roof, the crossbars or collars are sometimes hitched into the coal instead of being supported on legs. At other times, short legs are used and these are set in hitches cut in the coal. On steep inclinations, particularly where there is considerable side pressure, the framing of the timbers on gangways must be such as to conform to the conditions.

The timbering of rooms and chambers, in flat seams, must always be modified to suit the conditions of roof and floor. With a frail roof, or where slips occur in the roof, systematic timbering should be followed, the posts being set at specified distances apart, in rows, and staggered. When the seam is inclined, the posts must be "underset," or inclined slightly up the pitch, the amount depending on the inclination of the seam.

Ques.—In case of an accident in which a miner has received a wound severing an artery, what would you do to prevent hemorrhage before a physician arrives?

Ans.—If the wound is in the arm or leg, a rope or strong bandage should be wound about the member, at a point between the wound and the heart. The bandage is then tightened by inserting a stick beneath it and twisting the stick. A small stone or pad should be placed over the artery so that the tightening of the bandage will press the artery more tightly and stop the flow of blood from the wound. Where the flow is from several small arteries, or the wound is in a place that the flow cannot be stopped in this manner, it may be possible to coagulate the blood and reduce or stop the flow by applying sulphate of iron, either powdered or in a strong solution, by means of a sponge.

If there is bleeding from the lungs and the injured person coughs blood, he should be placed in a reclining position with head and shoulders slightly raised. Keep him cool and quiet and, if possible, give him ice to swallow. Restore his confidence by assuring him that there is no danger. If the bleeding comes from the stomach, the blood will look dark and clotted. The man should be made to swallow ice and given ice water to drink; also, an occasional teaspoonful of vinegar should be administered. Keep the stomach cool by applying a towel holding cracked ice to that part. Make no delay in sending for a physician.

Ques.—What proportion of carbureted hydrogen (CH_4) is mixed with the air when a cap begins to appear on the light of a safety lamp, and at what proportion does it explode?

Ans.—The detection of a flame cap in a safety lamp depends not only on the kind of lamp used and the oil burned, but on the experience and ability of the observer to see the cap. Using a common Davy lamp burning sperm or cottonseed oil, the average fireboss will detect the first appearance of a cap when 2 per cent. of gas is present in the air entering the lamp. This percentage corresponds to a proportion of gas to air of 1:50. Special types of safety lamps are often employed, capable of detecting 1 per cent. of gas or less.

The lower explosive limit of pure methane and air is reached when the proportion of gas to air is 1:13, which corresponds to 7.14 per cent.

Ques.—If 30,000 cu.ft. of air is passing with a water gage of 1.6 in., what quantity will pass when the water gage is 2.5 in.?

Ans.—For the same conditions in the mine, the quantity of air in circulation varies as the square root of the unit pressure or water gage. In other words, the quantity ratio is equal to the square root of the water-gage ratio. Hence, calling the required quantity x,

$$\frac{x}{30{,}000} = \sqrt{\frac{2.5}{1.6}} = \sqrt{1.5625} = 1.25$$

$$x = 30{,}000 \times 1.25 = 37{,}500 \text{ cu.ft. per min.}$$

Ques.—Name three essential elements to the efficient ventilation of a mine.

Ans.—The three elements essential to efficient ventilation are: A mine fan of sufficient capacity to produce the required air volume; a proper distribution of the air current in the mine; and, third, well-built stoppings, doors and overcasts that will prevent the leakage of air through them.

COAL AND COKE NEWS

Harrisburg, Penn.

For the first time the Pennsylvania State Workmen's Compensation Board has made a commutation of an award of compensation to an injured man so that he could be reëducated. An order recently issued by Chairman Mackey provides that $300 shall be paid by the Buck Ridge Coal Mining Co., of Shamokin, to Ben Tomashefski, of Renshaw, Northumberland County, one of its miners who lost his sight when cutting coal, it being supposed that his pick struck an unexploded charge of powder and that the explosion blinded him. Mr. Mackey's order says that the employer and insurance carrier have joined in the petition for commutation of a sufficient amount to provide that the man may go to an institution for the blind for some education in order to acquire a new occupation and that the plan for reëducation has been approved. The $300 will be taken off the weekly payments made during the course of the year to the miner, and the order requires the insurance carrier to see that the claimant is placed in a proper home.

United States fuel authorities and representatives of organizations interested in natural gas have been invited by the Public Service Commission to participate in the conference to be held in Pittsburgh on Jan. 8, on the conservation of the supply of natural gas in Pennsylvania. The commission has invited natural gas companies of the state, especially those parties to pending complaints to the meeting, which will be held in the City-County building at Pittsburgh, a special request having been made that they be represented either by counsel or engineering representatives. The conference is to deal with supply, rates not being scheduled for consideration. S. S. Wyer, chief of the natural gas conservation work of the Federal Fuel Administration, has been asked to speak on the supply in Pennsylvania, and conservation will be discussed by L. L. Graham of the Pennsylvania and United companies. They will be the only set speakers, but there will be a general discussion.

Uniontown, Penn.

Production in the Connellsville coal and coke region showed an increase for the week ended Dec. 14. The outputs of 636,826 tons of coal was an increase of 36,245 tons over that of the previous week and 113,105 tons over that of Nov. 23, when the output in this region reached the rock bottom figure of 523,721 tons. The output for the week ended Dec. 14 showed a gain both in coke manufacture and shipments of raw coal, principally byproduct. The coke output of 281,950 tons was a gain of 10,957 tons over that of the week ended Dec. 7, and coal shipments of 213,901 tons was an increase of 29,811 tons over that of the previous week.

Steady increase in output is held by fuel officials and operators as proof that influenza is now rapidly losing its grip. Although the coming of peace, with its resultant relaxation of individual effort, contributed to the low record of 523,721 tons, influenza is held to be the principal factor for the great drop in production which commenced early in October. During the week under review a total of 5701 cars was lost because of labor shortage, 3146 in the coke trade and 2555 in the coal trade.

Charleston, W. Va.

A number of causes operated to materially reduce production in the Fairmont region during the week ending Dec. 21. In the first place cars were extremely scarce, the average not even being 1000 a day, and on the 19th the supply was down to 798, only a number of which were placed at operations in time for early loading. There has been a steady decrease in the supply of cars for several weeks, and a number of direct and indirect causes have been responsible for such a condition of affairs—motive power and traffic barriers having contributed to present conditions. Trouble was also experienced in getting an adequate supply of electric power, at least at some of the mines. Market conditions, generally speaking, are satisfactory, though there is an absence of any brisk demand for Fairmont coal.

So great was the accumulation of unloaded cars from the New River District that coal sold through five different agencies was embargoed, the embargo becoming effective on Dec. 19. This had made it necessary for several large operations to shut down, or at least to curtail operations, limiting their product to what can be handled inland. Orders for New River coal are plentiful. Lack of shipping facilities is the only adverse factor with which the district has to contend.

With a gradual expansion of the markets into which Kanawha coal may be shipped, more of the output of the district is now being absorbed than was the case a short time ago, and consequently a heavier demand is observed. Kanawha coal at the same time regaining a part of its former markets in the West. Producers are sanguine that as soon as large consumers have had an opportunity to adjust themselves to new conditions there will be a much better market for coal. Kanawha district mines were not materially affected by embargoes on tidewater shipments over the Chesapeake & Ohio, since the bulk of the coal from the district flows westward.

Birmingham, Ala.

Steady improvement is being shown in the coal production for the Birmingham coal-mining district, according to Government statistics. There has been no cessation of demands for coal so far, and all Alabama operators seem as anxious as ever to get the largest possible production from their mines.

Meetings were held Sunday, Dec. 22, in all camps of the district, at which organizers of the United Mine Workers urged the men to give their best efforts toward obtaining increased production. Leaders of the organized mine employees have finally decided that the contract between the employees and operators will continue in force until the peace negotiations have been concluded. This will mean that there will be no disturbance of the relationship that exists between the two interests, for several weeks at least. In possible readjustments there is not the slightest doubt in any circles in the Birmingham district that any trouble will be experienced.

Coal producers on the Warrior River are elated over the Government appropriation for development of that stream in the near future. Old equipment purchased from private corporations has been put on a regular schedule, and is being taken advantage of to the fullest extent. The new equipment for the service, on which bids have been asked, will not be in full service until the middle of 1919. The freight rate between Cordova and Mobile on coal is 20c. per ton less by barge than by rail.

New York, N. Y.

The demands of the marine workers in the port of New York wil now be considered by the National War Labor Board, of which former President Taft and Basil M. Manly are the joint chairman. This was decided upon on Saturday last, when the matter was referred to that body by the New York Harbor Wage Adjustment Board. This action was taken by the latter body because the boat owners had notified the Wage Adjustment Board that they could not be bound by any decision that might be made on the matter of the eight-hour day dispute. The Railroad Administration had withdrawn from representation on the Wage Adjustment Board and so far has refused to appoint a successor to its representative. Owing to this vacancy the boat owners refuse to abide by any decision made on the matter of the eight-hour day.

In addition to the demand for an eight-hour day, the workers want an advance in wages.

Having finished the work designated to him, John P. Collins, who was the personal representative in New York City of J. J. Storrow, the Fuel Administrator for New England, will soon close his office at 1 Broadway and return to Boston. Mr. Collins has been here since May last, and has looked after the shipments of the so-called "Storrow" coal from this port; in addition, he has seen that retail dealers located on the New England waterfront have received a good supply of the domestic sizes.

One of Mr. Collins' first duties here was to organize the Long Island Sound Barge Operators' Association, which is composed of 17 transportation companies engaged in carrying coal from the 13 local loading piers up the Sound. Mr. Collins found that these concerns were keen competitors and that considerable delay was caused by the slowness by which tows were taken to New England or empty barges returned. With the new organization completed, these concerns, all of which maintained their individuality so far as business was concerned, handled each other's tows when their own was small in either direction, thereby saving considerable time. The combined fleets of the 17 concerns composing the membership of the association consisted of 43 tugs and 385 coal-carrying barges.

Under Mr. Collins' direction New England has received more industrial coal than was ever before shipped to that section. One of Mr. Collins' hardest tasks was to arrange for shipments of anthracite coal to waterfront towns along the coast of Maine. He was so successful in this that he made an average shipment of five barges monthly, as a result of which these towns have received their allotment of domestic sizes.

Victoria, B. C.

The coal output for November, 1918, shows a material decrease in British Columbia in comparison with the previous month, the difference being approximately 49,476 tons. This is explained by the fact that the Vancouver Island collieries, in almost every instance, failed to do as well owing to the time lost by their employees, many of whom were off for periods of varying length owing to the epidemic of influenza. The production is placed at about 168,006 tons, while that for October was 217,482. The total output for the year 1918 up to the end of November, therefore, is about 2,372,161 tons, or an increase over 1917 of 222,186 tons.

A short time ago the SS. "War Charger," after taking on coal in British Columbia for a voyage to the Orient, had to put back to port for the reason, according to statements given publicity, that she was unable to proceed on this fuel. On returning she loaded with Welsh coal. This reflection on the steaming quality of British Columbia coal is resented, it being maintained that it has been subjected to every test, practical and otherwise, with the best results and that it is so satisfactory that one of the Vancouver Island collieries was able to enter into a contract to supply the Pacific Fleet of the United States naval forces. If the "War Charger" was in trouble of the kind, which there is no disposition to deny, it is asserted that she must have been given an exceedingly poor quality of fuel and that the responsibility should be placed where it belongs and should be generally understood in the interests of the industry. The Board of Trade of Vancouver City has taken the matter up, its members pointing out that the absence of a full explanation of the "Charger's" return is likely to leave the impression in England and elsewhere that a boat cannot be coaled in British Columbia to the satisfaction of the naval authorities. Some declare that the matter is of sufficient importance to warrant the fullest possible investigation by a civic commission.

PENNSYLVANIA

Anthracite

Hazleton—Influenza has again broken out in this region. At Eckley the Lehigh Valley Coal Co. has been hampered by the sickness among its employees. At Weston and Oneida the same company has a number of men off daily, due to the "flu." The labor disaffection in the First District (Wilkes-Barre) has not reached this field, and the men apparently are pleased with the recent wage increase.

Jeddo—The G. B. Markle Co. has employed thirty Mexicans who were recently released by the Bethlehem Steel Co. The Mexicans will work in the company's mines as miners' laborers.

Upper Lehigh—Thirty men were recently laid off at the Upper Lehigh colliery. The new breaker, which is electrically operated, is much smaller than the old one and it can be run with fewer men.

Hazleton—The Worthington Pump and Machinery Co., maker of munitions, has laid off nearly all its men, and many of them have been idle for the past four weeks. These are men who formerly held mechanical positions at the mines, and their places are filled. Operators still report a serious shortage of miners and miners' laborers, but the former munitions workers seem to prefer idleness to taking that class of work.

Hazleton—Anthracite coal operators in the Lehigh region are opposed to the movement started by the National Polish League to enroll Polish miners and other industrial workers for the purpose of inducing them to return to their native land, on the ground that the plan would seriously interfere with maintaining a maximum tonnage.

Nesquehoning—December marked the sixtieth anniversary of the fire at Summit Hill, and also marked renewed efforts on the part of the Lehigh Coal and Navigation Co. to "kill two birds with one stone," by starting a new stripping to get more tonnage and to attempt stamping out of the fire at the same time. Over $1,000,000 has been spent to confine this mine fire. It is now hoped to save tens of thousands of tons of coal out of the fire before it shall be consumed. A large force of men have began work in a new sector with steam shovels. The plan is to strip or remove the top of the mountain that overlies the burning section and take away veins of coal that lie in the path of the fire. The area to be stripped is 400 yd. wide and a mile long. The average stripping depth is 40 feet.

Scranton—So as to insure responsibility for mine caves, the Hand estate and other Scranton interests controlling the Park Hill coal tract, have refused permission to five or six companies, including the Delaware, Lackawanna & Western R.R., Coal Department, which have negotiated for the lease, to mine the 5-ft. and 4-ft., the two top veins of coal, unless the operating company will assume all responsibility for damages occurring to the surface and buildings. It is said that this condition has proved the stumbling block so far in the different negotiations, but that three-fourths of the ownership, consisting of out-of-Scranton residents, are standing pat on the proposition.

Edwardsville—Barring unforeseen accidents, the new $2,000,000 steel breaker of the Delaware, Lackawanna & Western R.R. Coal Department, which was referred to in the news pages of *Coal Age*, Dec. 26, will be in operation by spring. The new breaker is designed to have a capacity of 8000 tons daily, which is double the capacity of the old wooden breaker it will displace. The coal will be prepared in nine sizes.

Bituminous

Pittsburgh—The tipple of the Pike County Coal Co., which was completely destroyed by fire a short time ago, has been rebuilt and is now in full operation. The contract for the reconstruction work was placed with Roberts & Schaefer Company.

Smithfield—The Russell Coal and Coke Co. has purchased five acres of land of the Henry Mathiot tract, near here.

Indiana—A company has been organized and has taken several leases on a large acreage of coal land between Savan and Locust, Indiana County. Several openings which have been operating as wagon mines will be improved and the coal will be brought to a central tipple to be erected on the Work farm. The shipments will be made over the Buffalo, Rochester & Pittsburgh Railway.

Black Lick—The Hetrick Coal Co. is constructing a tram road 2000 ft. long from its mine to the tipple of the Smith Coal Co. The mine was formerly operated as a wagon mine and has considerable development under way. It will add about 100 tons per day to the tipple tonnage of the Smith operation.

Homer City—Henry Reed has sold his mine, which is opened on the Sutter farm near Meco, to George Bulga, of this place.

Locust—The Locust Colliery Co. has completed several new miner's dwellings here. They are of the modern type and of excellent structure. Since the installation of electrical machinery in the mine a few weeks ago the production has been doubled.

WEST VIRGINIA

Williamson—Information from various parts of Mingo County, where there were many wagon mines opened during the war, is to the effect that every wagon mine in the county has been closed down. West of Williamson many of the larger mines have also suspended operations because of zone restrictions, and other mines are being operated on part time only.

Beckley—Early in January the improvements now under way at the plant of the Clyde-Pocahontas Coal Co., at Besoco, Raleigh County, will have been completed. The company is now installing a new generator and is completing the erection of a new substation.

Macdonald.— Supplementing previous mention of the extensive improvements being made by the New River Co. in its power facilities in connection with the operation of its mines at Sprague, such improvements are to cost in the neighborhood of $40,000. The new substation carries two 150-kw. sets and the building which houses the equipment is of brick, with concrete base and floors and a steel roof. It is about 35 x 45 ft. in size. The station has been in operation for about three weeks. A similar power plant is being built by the company at its Skelton operation, 14 of these substations already having been installed for the company.

Bluefield—In an explosion early on the morning of Saturday, Dec. 21, in the Havaco mine of the New River Pocahontas Consolidated Coal Co. at Havaco, near Welch, two men were killed and two members of a rescue party were overcome by afterdamp, when their gas masks leaked. The dead are: John Farmer, mine foreman; Samuel Jones, pumper; Fred Paulick, miner; Martin Harrock, miner. The Havaco is a shaft mine. Rescue parties were at work early, but were unable to penetrate to the point in the mine where the explosion occurred. So far the cause of the explosion has not been determined.

INDIANA

Vincennes—The first mine rescue station in Indiana will soon be in operation in Vincennes. William H. Forbes, who will be in charge, announces that he will have everything in readiness for an emergency within the next week. Until the completion of the new addition to the Vincennes Federal building the station will be maintained in the city hall. The equipment on hand includes ten Fluess type of self-contained breathing apparatus, each weighing 35 lb. Mr. Forbes expects the United States Bureau of Mines to provide at least ten apparatus of the Gibbs type, which are somewhat different from the Fluess, although both are made so that the man wearing them does not have to depend upon air from the exterior. Microphones and geophones, which are now in the possession of the United States Bureau of Mines will probably be shipped to Vincennes and used with the other devices for rescue work. These instruments can be used for the purpose of determining the location of men entombed in coal mines. In addition to the mine rescue work public classes in first-aid to the injured will be conducted in Vincennes and probably in Bicknell.

ILLINOIS

Carlinville—That Macoupin County, Illinois, is to be a greater coal-mining district than any oldtimer ever dreamed of is further demonstrated with the development of the field near Plainview. A. W. Crawford and his son, A. M. Crawford, have promoted many of the fields of the county and they are now interested in the Plainview developments. Drills have been ordered and prospecting will be begun at once. If coal is found in paying quantities the right will be paid for according to the terms of the options now held on many hundreds of acres of land in that vicinity.

Carlinville—A strike of ten days on the Illinois Traction System seriously interfered with the output of coal in this district. Many of the mines, especially smaller ones, depended entirely upon the interurban line for the transportation of supplies necessary for the operation of the mines. When the cars stopped running the mines were forced to close.

McLeansboro—Several test holes have been bored in Hamilton County which show a vein of 7 ft. 9 in. at a depth of somewhere near 700 feet. Options have been taken on land and work of organizing another coal company has been begun. The land in question is north of McLeansboro.

Carlinville—On Dec. 14 the Carlinville Mining Co. struck the coal seam in its new shaft. The seam is 7 ft. thick with a good roof, and the quality of the coal is said to be good. The mine was started about three months ago and the work has been pushed rapidly. The work of opening up the entry and placing the mine in full operation will proceed as rapidly as possible.

IOWA

Des Moines—The Blount Coal Co. is abandoning its American mine, west of the city, and at present is drawing pillars. The equipment will be moved to the company's new Interurban mine, which is to have a capacity of 400 tons per day.

Foreign News

London, England—London can get coal from Spitzbergen cheaper than it can be delivered from the collieries of Newcastle, and of a better quality. Enough coal is available there to pay the cost of the present war.

Victoria, B. C.—Diamond drilling of some coal property situated near the Sable River, Vancouver Island, is to be undertaken at an early date. A road now is being constructed up the river to permit the shipment of machinery to the prospect.

Nanaimo, B. C.—The Granby Consolidated Mining, Smelting and Power Co., Ltd., has awarded the Roberts & Schaefer Co. a contract for the erection of the coal washery to be located at the new mine near Cassidy's Siding. This company has completely equipped the tipple at this point, installation comprising Marcus picking table screens and loading booms.

Prince Rupert, B. C.—The coal problem has become so live an issue in this city that the City Council has appointed a special committee to investigate and report. It was charged recently that not only were the consumers of this community required to pay exorbitantly for their fuel, but that what they bought was much below the standard of first-class domestic coal. It seems that the Telkwa mine, situated on the Grand Trunk Pacific Railway, a short distance from Prince Rupert, has been unable to meet the demand chiefly because of difficulties encountered in obtaining transportation facilities. However, bunkers now have been built at a mine, a siding constructed, and arrangements effected which it is said will permit the shipment of a carload a day to the city.

Berlin—Under date of Dec. 23 the *Tageblatt* says it is informed that new strikes have broken out in the Silesian coal field, as a result of agitation carried on by agents of Dr. Liebknecht, radical socialist leader. [The Silesian coal field is in Poland.] The agents succeeded in inducing the miners to repudiate an agreement that recently had been entered into with the mine owners. The present Silesian output is half that of normal times. The Rhenish Westphalian coal fields also are partly paralyzed by a strike which has cut down the usual output one-third. The Socialist *Vorwaerts* declares that the entire industrial activity of Saxony will be crippled within two weeks unless more coal is assured.

Sydney, N. S.—Another development has come about in connection with the dispute concerning the operation of the submarine coal areas at Sydney mines. Some time ago the Nova Scotia Steel and Coal Co. sought from Fuel Controller Magrath an order granting it the right to operate on some of the Dominion Coal Co.'s areas. After hearing the case the Controller recommended that a 500-ft. strip of coal to the south part of the Princess mine should be taken from the Dominion Co. and given to the Nova Scotia, and that a 1000-ft. strip north of the Florence workings would also be taken. It is believed, however, that the Federal Government has not the power to take either of these areas but, if it desires to act, must expropriate and leave the question of damages and value to the Exchequer Court. It is now understood that the Dominion Coal Co. is prepared to take over the Florence slope from the Nova Scotia and guarantee its continuous working, or in case the Nova Scotia Company will not agree to this, the Dominion is ready to proceed to open its own slope and utilize the coal areas in that vicinity.

Personals

Tipton Stillwell, sales manager for the Boehmer Coal Co., St. Louis, Mo., resigned that position to go with the Bell & Zoller Coal Mining Co., of St. Louis.

George A. Ramsey has succeeded **R. T. Heller** as manager of the Columbus (Ohio) office of the Lake Erie Coal Co., the latter returning to the Cleveland office. Mr. Ramsey was formerly a resident of Columbus.

M. L. O'Neale has resigned as superintendent of the Connellsville Basin Coke Co., near Morgantown, W. Va., to accept the position of mine and mill superintendent of the New York Pyrites Co., at Gouverneur, N. Y.

Captain R. L. Douglass, who has been with the Fuel and Forage Division of the Ordnance Department, has resigned his commission and accepted the position of assistant general sales agent with the Consolidated Coal Co., of St. Louis.

Ben Percy, of Woodward, Jefferson County, Alabama, has resigned his position as general superintendent of coal mines of the Woodward Iron Co., of Woodward, Ala., effective Jan. 1, 1919. His successor has not yet been appointed.

E. G. Ridgway, for the past two years connected with the St. Louis office of the Peabody Coal Co., and previously in charge of the St. Louis office of George G. Pope & Co., has gone into business under the style of E. G. Ridgway, 1220 Syndicate Trust Building, St. Louis, Mo.

F. E. Bourget, who for the past thirteen months has been handling the distribution of bituminous coal throughout Oiho, Michigan, Indiana and West, for the United States Fuel Administration, has resigned to accept the position of special sales agent of the Interstate Coal and Dock Co., with offices at Cincinnati, Ohio.

Horace N. Trumbull, who has recently received his discharge from the Engineers Officers' Training School at Camp A. A. Humphreys, Va., has been appointed advertising manager of the Wellman-Seaver-Morgan Co., of Cleveland, Ohio. Before entering the service, Mr. Trumbull was advertising manager of the SKF Ball Bearing Co., of Hartford, Conn.

Capt. Edward Steidle, of the chemical warfare service, on his return from France will be restored to his old position, that of being in charge of Bureau of Mines Rescue Car No. 1. Captain Steidle went to France with one of the first gas and flame companies and saw much active service. He received a severe wound in the face, which destroyed the sight in one eye.

Joseph E. Thompson, of Benton, Ill., has been appointed director of the department of mines and minerals for the state to succeed Evan John, recently deceased. Mr. Thompson is well-known through the southern Illinois field. He was born in England and his first mining experience was obtained there. Since coming to this country he has had ample experience to qualify him for mine work. He has served in various important positions throughout the mining fields in Illinois.

H. W. Clarke, who until Dec. 15 was connected with the Advertising Service Department of the McGraw-Hill Co., at Chicago, has been appointed manager of advertising for the Chicago Pneumatic Tool Co., Chicago, Ill. Mr. Clarke has been identified with the engineering advertising field for several years. Prior to his connection with the McGraw-Hill publications he spent eight years with the Westinghouse Electric and Manufacturing Co., East Pittsburgh, Penn., part of the time as a member of the sales and publicity departments and later as Western publicity representative with headquarters at Chicago.

Obituary

Henry D. Thomson, aged 63 years, superintendent of the Fairhaven mine of the Pittsburgh Coal Co., died Dec. 24 at his home, at Carrick, Penn., of heart trouble. Mr. Braddock was born near Braddock and had lived on the South Side and in the Pittsburgh district. He had been with the Pittsburgh Coal Co. since its organization. For eight years he was superintendent of mines at Willock. A year ago he removed to Fairhaven.

Industrial News

Canton, Ohio—The capital of the Huff Run Coal Co. has been increased from $50,000 to $100,000.

Bellevue, Ky.—The Gorman Coal and Supply Co., capital $25,000, has been incorporated by E. A. Gorman, W. P. Neekamp and A. Z. Litz.

Russellton, Penn.—The Republic Collieries Co. has contracted with the Roberts & Schaefer Co. for a Marcus screen to be installed in its tipple at this place.

Cleveland, Ohio—The Cambrai Coal Co. has been chartered with a capital of $300,000 by E. S. Wertz, E. K. Geiselman, Joseph G. Breitenstein, D. E. Wertz and E. J. Wertz.

East Greenville, Ohio—The Dalton Coal Mining Co. has been chartered with a capital of $85,000 by George A. Enos, Fred S. McConnell, E. J. Underhill, R. M. Koob and Harry Abels.

Birmingham, Ala.—The Natural Bridge Coal Co. has been incorporated here, with a capital stock of $10,000. W. M. Holt is president and Palmer Daugette, secretary, Birmingham, Ala.

Cincinnati, Ohio—The Meadows Cannel Coal Co. has been chartered with a capital of $30,000 by Okey Meadows, Louis H. Stone, W. H. Schilderick, John R. Schindel and H. E. Christman.

Ashland, Ky.—The Lackey Coal Mining Co., recently organized with a capital of $100,000, has leased extensive coal properties along Beaver Creek and is arranging for early development.

Clarksburg, W. Va.—The Edgar Coal Co. has been incorporated by E. H. Bell, J. W. Agner, Harry W. Sheets, and others, all of Clarksburg, with a capital stock of $25,000, to operate a coal mine in Harrison County.

Huntington, W. Va.—Owing to the absence of many members of the West Virginia Coal Mining Institute, the winter meeting has been postponed. The next meeting of the Institute will be held in June, 1919.

Hartland, W. Va.—The Moran Coal Co., recently incorporated with a capital of $100,000, has perfected its organization. The company has acquired the plant of the Hartland Fuel Co., and is planning to increase the present capacity of two cars per day. Sam Moran is president.

Columbus, Ohio—W. K. Field, of Columbus, president of the Pittsburgh Coal Co., is also president of the Pittsburgh Coal Co. of Illinois, a new $2,000,000 corporation, chartered to carry on business in the State of Illinois. H. J. Elliott, of Chicago, will represent the company in that state.

Clarksburg, W. Va.—The Edgar Coal Co. has been organized for the purpose of mining coal in Harrison County, the new company having a capital of $25,000. Clarksburg people incorporated the company. Their names are E. H. Bell, Estelle Talbott, J. W. Agnew, Maud R. Agnew and Harry W. Sheets.

Charleston, W. Va.—The Charleston Domestic Coal Co., of which J. S. McVey, of Columbus, is president, has closed a deal whereby it has sold a working property of 900 acres on the Kanawha & Michigan west of Charleston to the Charleston Co-operative Coal Co. The plant has a capacity of about 600 tons daily.

Logan, W. Va.—The Peach Creek Coal Co., with an authorized capital of $99,000, plans the development of coal lands in Logan County, near Hughey, on an extensive scale. Those chiefly interested in the new company include N. E. and George C. Steele, M. E. Robinson, Mrs. Maude Steele and C. S. Minter, all of Hughey.

St. Louis, Mo.—The St. Louis Coal Co., one of the oldest jobbing and operating concerns in the city, was recently absorbed by the Lumaghi Coal Co. The St. Louis Coal Co. had three mines—the Slogo mine, at Marion, Ill., the Coulterville mine at Coulterville, Ill., and the Henrietta mine, recently dismantled, near Edwardsville, Ill.

Columbus, Ohio—Bids will be opened Jan. 6 by George A. Borden, president of the Columbus Board of Purchase, for 1400 tons of Hocking nut, pea and slack for the garbage and refuse disposal plants; 2000 tons of Hocking nut, pea and slack for the water-works department, and 3500 tons of Hocking nut, pea and slack for the municipal lighting plant.

Cleveland, Ohio—The Wellman-Seaver-Morgan Co., of Cleveland, Ohio, has opened a San Francisco office at 415-417 Rialto Building, in charge of Norman S. Ross. Business originating from California, Nevada west of the 115th meridian, lower California and the counties of Josephine, Jackson and Klamath, in Oregon, will receive the prompt attention of Mr. Ross.

Louisville, Ky.—A recent report from Whitesburg, Ky., was to the effect that the Woodburn Coal Co. has about completed its new mining town near Blackey, on the Rockhouse Creek branch railroad, and the new town of Woodburn. The company expects that the branch line will be ready to receive coal shortly after the first of the year, and will be ready to make shipments.

Birmingham, Ala.—The Frisco system on Dec. 21 announced an increase of five cents a ton on coal shipments from Alabama mines into Birmingham, effective Dec. 26. The rates with the increase added make the charge on these shipments 70c. from group 1, 80c. from group 2 and 85c. from group 3. A year ago the rates from these points were 30c. from group 1 and 40c. from groups 2 and 3, the last advance making the rate more than double from groups 1 and 2 and almost double from group 3.

Harrisburg, Penn.—Fewer accidents were recorded in the mines of Pennsylvania during the first eleven months of 1918 than in the corresponding period of 1917. Records compiled by the State Department of Mines show that in the anthracite region there were 419 fatal accidents inside the mines and 89 outside, in the period referred to, compared with 451 inside and 91 outside for 1917. In the bituminous region in 1918, there were 416 inside accidents and 45 outside, compared with 424 inside and 37 outside of the mines in 1917.

St. Marys Falls Canal, Mich.—During the season 1918 a total of 15,770,560 net tons of bituminous coal passed through the canals at Sault Ste. Marie, Michigan and Ontario, as compared with 15,736,654 net tons for the season of 1917, an increase of 33,906 net tons. The total of anthracite going through in 1918 was 2,211,050 net tons, as against 2,562,199 in 1917, a decrease of 351,149 net tons. The United States Canal was opened Apr. 20 and closed Dec. 14, 1918; season, 239 days. The Canadian Canal opened Apr. 23 and closed Dec. 17, 1918; season 239 days.

Philadelphia, Penn.—The famous Greenwich coal piers of the Pennsylvania Railroad are being demolished. These piers at the foot of Snyder Ave., at the time of their erection more than 25 years ago, were the finest in existence, having 80 loading chutes on the five piers. After the site has been cleared, which it is estimated will take a year, the city will erect municipal piers on the ground. The railroad company adready has in use a new series of piers just to the north of the old ones, the new piers being outfitted with modern car dumpers and capable of handling 25,000 tons of coal a day.

Columbus, Ohio—A complete reorganization of the Sunday Creek Coal Co., the New Jersey corporation, has been effected by the election of John H. Winder, president; P. A. Coen, vice president; J. P. Smith, secretary, and C. C. Cook, treasurer. J. S. Jones, the owner, was elected chairman of the board of trustees. The capitalization remains at $4,000,000, and the company will continue to operate under the New Jersey charter. The receivership, which continued for more than two years, was lifted recently upon orders of the court. Mr. Coen will continue as president of the Buckeye Coal and Railway Co., and the Ohio Land and Railway Co.

Bluefield, W. Va.—Chartered a short time ago with a capital of $300,000, the Big Munsey Coal Land Corporation has been launched as an important factor in the coal industry, officers having been elected a few days ago at a meeting held here, with M. H. Pedigo, of this city, as the company's first president. The vice president is A. F. Leckie and the secretary, A. E. Jennings. On the board of directors are William Leckie, M. H. Pedico, A. E. Jennings, A. F. Leckie, W. S. Morris, T. S. Crockett and J. T. Wooten. The Big Munsey company has acquired about 2000 acres of land on Pigeon Creek, in the Thacker field, much of which is covered with fine timber as well as being underlaid with six different seams of coal with a total aggregate thickness of 35 feet.

Seattle, Wash.—The Alaska Bureau of the Seattle Chamber of Commerce and Commercial Club recently received an urgent appeal for a supply of fuel from the Territorial Council of Defense, Juneau, Alaska. W. A. Clark, chairman of the latter body, stated that there was only enough coal in Juneau at that time to last four days and that none was to be found at Douglas City. As Juneau is in the Government Forest Reserve, no wood was available. Mr. Clark was told that the delay in dispatching fuel to the North was owing to the fact that the vessels of the Seattle-Alaska fleet could obtain none in the Northwest. Since then, however, the freighter "Latouche" loaded 800 tons at the Pacific Coast Coal Mining Co.'s bunkers, Seattle, and will discharge it at Wrangell and Juneau. It is feared that if shipments are not maintained more regularly there will be much suffering in the northern British Columbia and Alaska centers this winter.

MARKET DEPARTMENT

Weekly Review

Decrease in Production of Soft Coal Serves to Tighten Market—Purchasing Agents Now Out of the Market May Find It Hard to Get Coal Later—Anthracite Situation Exceedingly Favorable Due to Mild Weather.

THERE is an element of danger to consumers of bituminous coal in the present stagnant condition of the coal market. Production has declined steadily since the latter part of September, due partly to car shortage, to lack of labor and of late to a lack of demand. Instead of buying coal for their current needs and keeping their stock piles in reserve to meet possible emergencies, industrial consumers are staying out of the market and revert to their storage piles in the belief that prices must soon come down.

If production of coal had been maintained at its former high level, this attitude on the part of buyers would have demoralized the industry; for with an overstocked market prices undoubtedly would have fallen considerably below the Government maxima, and purchasers could have dictated as to quality and price. In fact bituminous operators only a short while ago, were decidedly pessimistic over the outlook. However, from the operator's point of view the situation now evidences signs of improvement. Modifications of zoning restrictions have enabled many mines to extend their shipping radius. Government prices have been adhered to rather generally, due to the fact that production has constantly been decreasing, and consumers who have depleted their accumulated reserves may find themselves unable to get all the coal they want just when they want it.

Labor in the bituminous regions is restless, transportation will slow up during stormy weather, and taking it all in all, the better part of wisdom would be for buyers to take advantage of the present favorable situation and keep the mines working. Government prices will not be abandoned before Feb. 1, and it may be that even if price control is relinquished the zone system of distribution will be adhered to. The need for transportation is as great as ever, and it has been definitely ascertained that the establishment of the zones has been responsible for the saving of thousands of car-miles.

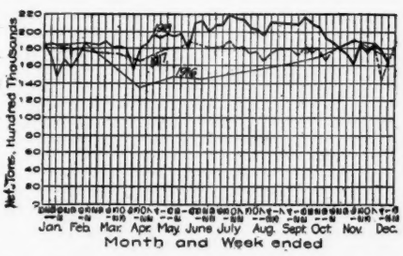
During the week ended Dec. 21 (the latest statistics available) the output of bituminous coal is estimated at 10,136,000 net tons. Production has fallen off in Ohio, Pennsylvania and West Virginia, though a slight improvement is discernible in the reports coming from Illinois and Indiana. For the coal year to date the total output of bituminous is 441,361,000 net tons, more than 38,000,000 net tons greater than the output of the same period in 1917.

Owing to the continuance of favorable weather on the Atlantic seaboard, the demand for anthracite coal has not been urgent. The distribution of the available tonnage has been accomplished with a great deal of efficiency, and at Christmas time not a single city in the United States reported a serious need for hard coal with the exception of Elizabeth, N. J. Emergency shipments were rushed to that point to relieve the situation. Dealers can dispose promptly of their stocks of the larger domestic sizes of anthracite, while buckwheat, rice and barley (the so-called steam sizes) are plentiful and do not move rapidly.

During the week ended Dec. 21 the output of anthracite coal is estimated at 1,839,000 net tons. The total production for the coal year to date is 72,541,000 net tons, a decrease of 1,400,000 net tons compared to the corresponding period of 1917.

WEEKLY COAL PRODUCTION

Bituminous—The decrease in the production of bituminous coal in the week ended Dec. 21, of nearly 500,000 tons, compared with the previous week, was largely in the Ohio, Pennsylvania and West Virginia districts. In Illinois, Indiana and the fields south and west, slight gains are reported, but shipments were below the corresponding



week of 1917. The estimated average daily output decreased from 1,831,000 tons in the week ended Dec. 14, to 1,689,000 tons in the week ended Dec. 21. Production in the week of Dec. 21, 1917, was greater by about 800,000 tons than that recorded in the corresponding week of 1918.

Anthracite—The production of anthracite in the week ended Dec. 21 is estimated at 1,839,000 net tons, a decrease compared with 1,924,000 tons the previous week, but a gain compared with the corresponding week of 1917. The total production from Apr. 1 to date is estimated at 72,541,000 net tons, about 1,400,000 tons less than in the corresponding period of 1917. The record for the calendar years 1918 and 1917, however, will not show as great a difference.

Rail receipts and tidewater dumping for New England were 258,000 net tons in the week of Dec. 21, compared with 326,500 tons the week of Dec. 14, and a weekly average of 542,700 tons for the coal year to date.

Total dumping at the North Atlantic harbors decreased slightly in the week of Dec. 21, from 695,506 net tons to 642,575 tons. New York and Philadelphia reported an increase of 40,000 tons, Baltimore and Hampton Roads recording decreases.

Beehive Coke—The production of beehive coke in the week ended Dec. 21 is estimated at 570,000 net tons, compared with 553,000 tons the previous week, and 657,000 tons in the coresponding week of 1917.

Byproduct Coke—Little change was reported in the production of byproduct coke, the output for the week ended Dec. 21—579,268 net tons—representing only a slight decrease below the previous week. Operators in New York State report continued difficulty in obtaining adequate supplies of coal. Operation below capacity is also reported from Massachusetts and Pennsylvania because of lack of demand for the coke. Lengthened coking time and the use of coal from stock piles that gives an improper mixture, causing the coke to stick in the ovens, are among the reasons ascribed for loss of maximum capacity.

BUSINESS OPINIONS

Marshall Field & Co.—Current wholesale distribution of dry goods is running about the same as for the corresponding week of 1917. Road sales for both immediate and future delivery were less than for the same week of last year. Retailers report that holiday business reached a most gratifying total. Collections are good.

Dry Goods Economist—The higher market for raw cotton has its influence on cotton goods prices. The high of last week (29.44c.) having been superseded by a raw high of 32.60c. for spots, prices for gray cloths at the mills advanced ½ to 1c. per yard. Finished cotton goods, however, have not advanced. While the list prices issued by mills and by selling agents are unchanged, however, concessions which could be had in some cases last week are now denied. Jobbers declare that lower prices on cotton fabrics of all classes are out of the question, and expect the quotations now ruling to continue in effect for at least a month to come.

American Wool and Cotton Reporter—There is a large supply of wool in the world, in fact, a great oversupply, as compared with an undersupply of cotton. This is exactly the opposite condition to that which was expected when the war commenced, and it is likely to be a rather long time before anything like a satisfactory condition can develop in regard to raw material. For cotton there has been some improvement during the week under review. This improvement is based largely upon the more or less steady export sale of cotton, and upon improvement in so-called trade buying. Unquestionably, the industry in the United States is consuming less cotton than it has for a long time, and the consumption is still declining rather fast.

Bradstreet's—The larger aspects of things indicate conservatism, much feeling about for definite tendencies preparatory to swinging back to normal, further cancellations, inventorying, increased supplies of labor, downward revisions in prices of metals, divorcing of the government from commercial operations, and preparations for the marketing of supplies that

had been gathered for the purposes of war. The present post-holiday lull in wholesale and manufacturing quarters is more noticeable than a year ago, when war work kept things moving at a feverish pace, and marking time will probably be the rule until salesmen in numbers again take to the road or buyers arrive at the principal markets. Meantime, extensive plans are afoot for seeking trade abroad and here, and while elements of uncertainty hold more or less sway, pessimism is conspicuous by its absence.

The Iron Age—Sellers continue to call attention to high costs and low stocks and it certainly is true that the stocks of pig iron in furnace yards are very low, but there is an increasing tendency on the part of pig iron sellers to accept the new schedule which reduces prices $3 per ton on sales for delivery after Jan. 1. A few furnaces still insist that they will not reduce prices, but it is probable that at an early date the quoting at the lower level will prevail as to a very large percentage of the tonnage still to be sold for the first half of 1919. Statistics show, however, that many furnaces are sold up to July 1 as to 90 per cent. of their estimated production. In finished materials, there is very little buying at the new schedule. This causes no disappointment, for it was not expected, during the holiday season with so much uncertainty existing for various reasons as to the future, that buying would be active.

Atlantic Seaboard

BOSTON

Little inquiry. Railroads cease buying. All-rail movement continues light. No significant developments as to prices. Somewhat more optimism as to the future. Embargo against all-rail route via Shippensburg lifted. Hampton Roads dumpings light for New England. Uncertainty as to marine freights. Rumor that rehandling factors are seeking to "cover" contracts. Some inquiry for high volatiles. Narrow market over New York piers, and surplus of barges. Water-borne coal practically unsalable in open market. Few steamers now in coastwise trade. Anthracite movement improves both all-rail and by water. Railroad Administration standardizes rates on railroad-owned barges. Surplus of broken, egg and pea in most cities; stove and chestnut still scarce. Fuel Administration still holds on to distribution.

Bituminous—Salesmen who are canvassing the trade are able to develop little inquiry. The weight of opinion is all against buying fuel that will not be used for months, and there is too great anxiety on the part of steam-users to get clear of coal now on their dumps to warrant them in making purchases at this juncture. Uncertainty there is as to the future, but there are few who believe that even the fancy grades will command anything over the present Government level when the market opens in the spring. There have been quiet intimations lately that certain standard coals could be had for 15 and 20c. off, but these instances are hard to verify and without doubt reflect more the desire of the selling agent for business rather than any such desire on the part of the operator. Quotations of this kind are of course only for spot shipment.

Even the few railroads that were buying current all-rail to avoid picking up too much from storage have now ceased to place orders, and the market is bare indeed of new business. The railroads are particularly anxious at this time not to commit themselves for any definite price beyond the present, for the whole question of price on railroad supply coal is likely to be raised very shortly, even if the Fuel Administration refrains from withdrawing the fixed price. All concerned will make moves very cautiously the next few weeks.

On the part of several of the Pennsylvania shippers there are extra efforts just now to dispose of smithing coal, especially in box cars, but the outlet in this territory is much restricted, so much box-car coal having been placed through the Fuel Administration during July, August and September. Other than this there seems little consistent effort to place coal. A few of the power plants whose regular source of supply has been affected by influenza or shortage of labor for other reasons have made conservative purchases, but the tonnage has been small and the prices paid were closely in line with regulations.

All-rail movement continues very light, as indeed does all traffic on the New England roads. The average daily receipts for the past week at the five gateways were but 219 cars commercial bituminous, although railroad fuel showed something of an increase. The latter is accounted for by the beginning of deliveries on the part of some operators who failed to make them earlier on their contracts. It should also be remembered that there is still quite a volume of coal due the railroads on long-term contracts made well before coal took its upward swing nearly three years ago. All reports from the different regions show no dearth of car-supply; the low output is due almost entirely to illness and the disinclination of miners to work more than a few hours a day.

The small receipts from every quarter give the trade reason to feel more optimistic as to the future. While the weather is mild and stocks are not being depleted as a year ago, the fact remains they are getting less all the time and shipments are well below actual consumption. It is only a question when buying will begin; whether in April or earlier. A great deal depends upon the tide-water situation and the cost of coal by that route. If the prospect is for high prices in that connection then there will almost certainly be an active market for all the good grade coal that can possibly reach New England by rail. That much seems plain. And it is also a fact that curtailment has not been so drastic in the different lines of manufacture as was feared when the armistice was signed. All in all there is less pessimism in trade circles than two months ago, and there is not the apprehension over the possible withdrawal of the Government price.

A zone modification order made public in Washington on Dec. 24 permits shipments now via Shippensburg from operations on the Baltimore & Ohio and the Western Maryland railroads, thereby reopening the all-rail route to New England points. This is received with a good deal of relief by consumers who made contracts last year assuming the coal would continue to move all-rail and then were obliged later to accept delivery via the New York and Baltimore piers, with all the attendant charges.

At Hampton Roads there is still a large surplus of coal as compared with bottoms to load. Steamers and barges for New England grow smaller and smaller in number, and there are days when the clearances for this territory are practically nothing. Shipments on contract are extremely light, and are confined for the most part to large requirements where storage for more than a few weeks is not readily available. The shippers are looking for a revision in rates from Hampton Roads to Boston, but no intimation has yet been made as to what the new freights will be. Until some announcement of policy in this respect is made by the Shipping Board, it will be impossible to open the way for a new contract season.

Certain of the rehandling factors, however, have already approached their trade with propositions that in consideration of service the past year the customer is looked to for a season order this year, the price to be arranged later, but the contract to be considered "covered." This is what is expected to happen where connections have been strong for a term of years, but it is a little unusual to approach new trade in this way. Other than this there are no developments looking to season contracts.

There are signs of restricted inquiry for some of the fancy high volatile grades. It is natural that there should be dissatisfaction over the treatment accorded some of the consumers of these grades and that there should be attempts to close elsewhere the coming season. This is particularly true in cases where gas coal shippers have insisted that plants take their supply by water in the shippers' own transportation, and now there are some orders in the market for gas coal operators who are in position to send coal all-rail and will commit themselves to that route. Several of the shippers of high volatiles are discouraging in their predictions of light output. Some have gone so far as to say that the moment the Government price is taken off the better grades will soar at least $1 a ton.

The outlet for coals, even of fairly high grade, over the New York piers is narrow and inactive. Bunker demands are greater some weeks than others, but even for such purposes there is hardly a dependable market. Ports on Long Island Sound are taking little spot coal, and one result is a surplus of box barges. Water-borne coal in any port in New England is today practically unsalable, so far as the open spot market is concerned.

Anthracite—The movement of domestic sizes continues to improve all-rail but not to the extent anticipated. For the past week the average receipts were about 340 cars. The mild temperature of Christmas week had its effect upon the big city markets and for a day or two it looked as if coal would be rushed to New England by water in greater volume than at any time in a year. The barges were available and the coal was on hand, but the piers were so congested with the heavy accumulation of cars that undoubtedly a large tonnage was lost to New England. There were crews to load small boxes for New York retailers when the larger craft for this side of Cape Cod were left unattended. In spite of this, however, receipts have increased in several directions and it is now pretty well established that there is a surplus of broken, egg and pea in the hands of many dealers in the larger ports. Stove and chestnut are still scarce, but the companies are contriving to give each customer a share of the desirable sizes.

NEW YORK

Anthracite situation shows improvement. Domestic sizes continue to be short but demand falls off, most household consumers having received two-thirds of their winter supply. Smaller sizes plentiful and restrictions removed from buckwheat. Concessions on barley. Bituminous market unsteady. High grades scarce with fair and poor grades plentiful. Not much change expected during the next few weeks.

Anthracite—The situation shows a general improvement. There is a steadier movement of all domestic sizes, especially egg, stove and chestnut, which have been extremely short in this market for some time; and while the dealers could take care of heavier tonnages, there is plenty coming forward to meet current requirements. With conditions as they now are remaining for a few weeks longer, there are tradesmen who predict an overstocked market. Consumers, most of whom have already received two-thirds of their order placed last spring, are not willing to take the remaining third, and as a result retail dealers ended the year with deliveries slow and in some instances some of their help idle.

New York continues to live up to its reputation as a "weather market." Many consumers lay in only enough coal to tide them over a couple of weeks and then, when a sudden cold wave strikes the city or there is a heavy storm that interferes with traffic, they rush to their dealer with a rush order and expect it to be delivered at once. Present conditions are much the reverse of what they were a year ago, when the thermometer registered from 12 to 18 deg. lower than it registered the first of this week. At that time there was a serious coal shortage, and with the cold wave there was untold suffering, especially among the very poor.

Dumpings at the local docks for the seven-day period ended Dec. 27 amounted to 5691 cars, a decrease of 690 cars from the previous week. For the first 27 days of December there were 23,153 cars dumped, as compared with 19,724 cars for the corresponding period of November.

The situation with regards to the smaller sizes is unsteady. Supplies are steadily increasing and quotations below those made by the larger shippers and producers have been reported. Restrictions issued by the Anthracite Committee on May 27 against the shipment of No. 1 buckwheat and larger sizes to certain consumers have been removed to the extent that buckwheat can now be sold to any consumer who may wish to purchase it. This, it is believed, will go a long way toward keeping the stock of this coal down. The restrictions, however, continue in effect on shipments of pea and larger sizes.

Rice and barley are nearly a drug on the market. Stocks with some shippers are so large that concessions are being quoted, especially on barley.

The prospect of a settlement of the wage scale demands of drivers, engineers and yardmen employed by the retail dealers is not encouraging. Representatives of the State Labor Board, the War Labor Board and the State Fuel Administration have had conferences with the retail dealers and the representatives of the Union, but no satisfactory agreement has been entered into. If the demands of the men are granted it will involve a 50 per cent. wage increase, which would automatically increase the retail price of coal at least 50c. per ton, as the workmen, besides asking for a wage increase, also demand shorter hours of employment. The dealers consider that the advances asked for are unwarranted and beyond reason, some of them preferring to face a strike than to grant the increases. The men are also very determined, and say they will hold out for their demands.

Current quotations, per gross ton, f.o.b. Tidewater, at the lower ports are as follows:

	Circular	Individual
Broken	$7.80	$8.55
Egg	7.70	8.45
Stove	7.95	8.70
Chestnut	8.05	8.80
Pea	6.55	7.30
Buck	5.10@6.05	5.90@6.25
Rice	4.65	5.10
Barley	4.15	4.30
Boiler	4.60	

Quotations for domestic coals at the upper ports are generally 5c. higher on account of the difference in freight rates. Prices for buckwheat, rice, barley and boiler are not fixed by the Government.

Bituminous—There is no activity in the local market. High grades of coal are in good demand, but they are scarce, while there is plenty of the cheaper grades with no call for them. Consumers continue to depend upon their present stocks rather than lay in additional coal of an inferior quality at high prices. Many consumers, too, believe that prices will be lower when the restrictions are removed.

The only salvation of the trade is better coal-consuming weather. But even with lower temperatures no big improvement is looked for until about the middle of the month. Production already curtailed because of influenza and a desire on the part of labor to observe the holiday season, some by devoting several days to hunting, is not likely to show any improvement until about the second week of the month. Even then consumers will not be any too anxious to increase their holdings but will continue to watch the situation closely in the hope of picking up good coals at lower prices.

Producers and shippers are uncertain as to what the outcome will be after Feb. 1, to which time announcement has been made in Washington maximum prices and zone regulations are to remain in force. As has been previously stated, and the same seems to hold good now, the opinion is about evenly divided that prices for the higher grades of coal may advance slightly in accordance with demand and that those for the cheaper grades will decrease in the same proportion.

The matter of contracts is again coming to the front. Conditions similar to those existing last spring are now prevalent. Producers see no advantage in signing up a portion of their output with the price situation as it now is. On the other hand, there are consumers who are willing to make a contract providing a clause is inserted allowing a change in price if there should be one. Producers and shippers contend that there is nothing to be gained by making a contract because of the fact that at least in many instances, if there should be a lower price in vogue, the consumer would find some way to break it unless his shipper would agree to the lower figure. Then it is always customary for producers and shippers to take care of their regular customers, no matter what conditions might be, and at the regular market quotations.

Some shippers have had difficulty in moving refused coal and concessions of 50c. below the Government figure have been heard of. Some of the pools containing coals suitable for bunker purposes are reported as filled. This, it is said, is particularly true of Pool No. 10, and some of the shippers interested are said to be willing to forego part of their extra allowance of $1.35 in order to move their coal.

Reports have been received here of concessions for certain grades of Pittsburgh gas coal. The gas coal supply here is not as large as it was a few weeks ago, and prices are steady.

There were dumped at the local docks during the week ended Dec. 27 5128 cars, as compared with 6413 cars the week previous, a decrease of 1285 cars. For the first 27 days of December the dumpings amounted to 22 091 cars, as against 22,502 cars for the same period of November.

Current quotations, based in Government prices at the mines, net ton f.o.b., tidewater at the lower ports, are as follows:

	Mine, Gross	F.o.b. N. Y., Gross
Central Pennsylvania:		
Mine-Run, prepared or slack	$3.30	$5.45
Upper Potomac, Cumberland, and Piedmont Fields:		
Run-of-Mine	3.08	5.23
Prepared	3.36	5.51
Slack	2.80	4.95

Quotations at the upper ports are 5c. higher.

PHILADELPHIA

Anthracite trade still quiet. Weather very mild. Fuel officials urge buying. Credit question to the fore. Pea and egg becoming burdensome to shippers. Stove and nut supply improves. Steam sizes all dull. Buckwheat exemption cancelled. Bituminous short. Holidays cut production. Railroad confiscates best coal. Prices remain firm.

Anthracite—The fact that the local fuel administrator announces through the daily press that the public should not put off buying more coal because the weather is mild shows in a sense there is no active demand at present. Mr. Lewis states that the chances of obtaining a good supply now are probably better than they will be at any time later in the winter, and that consumers are making a mistake in waiting for severe weather before getting coal, when there is likely to be a rush and everybody will want coal at the same time.

After interviewing the largest retail concern in the city, we are more convinced than ever that the orders as originally placed by the householders were greatly inflated. This firm states that refusals to accept coal have recently become so numerous that they doubt if 10 per cent, of the unfilled orders now on hand would be received by the customers were they able to deliver the amount immediately.

Many dealers report their business in comfortable shape. They have no pressing demands that are neglected. A small number of consumers are soliciting credit, and this feature is being given some thought by the retailers. Of course, under the supervision of the Fuel Administration there is practically no competition in the coal trade, and dealers are still in position to demand cash with almost every delivery; the exception being such trade as has never abused its credit. However, the fact that the supply is becoming greater than the demand leads to the feeling that the restrictions of the Fuel Administration will be released almost over night. It is then that the customer will be permitted to go where he will to purchase coal; as a consequence, the dealers will have to once more offer inducements to keep their trade or to gather in new business. The producing companies are watching the situation closely and will make every effort to keep their accounts in good shape.

As to present supply, it would seem that retailers who are affiliated with the individuals are in good shape. It may be their production is above that of the basic year 1916-17, also it is possible that the anthracite committee is not making the same stringent demands as upon the big companies. It is becoming known that the larger operators, those who do not charge the differential of 75c. per ton, are receiving requests from quite a number of dealers to suspend shipments on egg and pea, and wonder is being expressed as to how the business of the smaller houses, especially on these two sizes, is being affected.

Limited production during the holidays and some colder weather will no doubt greatly alter the situation. Stove and chestnut are still in demand by practically all dealers. The largest operating company has made substantial gains where it was delinquent and few complaints are being made.

Another of the large companies has, however, made no progress whatever and is sadly neglecting this market. For some reason the fuel authorities are ordering heavy consignments of this coal in other directions, and it is leaving its customers here in desperate shape. Buyers who had been dealing with this concern exclusively are at their wits' ends and are free in expressing their determination to never again depend entirely on one shipper.

Strange as it may seem, a substantial tonnage of this company's business has been transferred by the fuel authorities to a middle house, and the coal will be shipped from an operation that has no direct selling force. The coal will therefore cost the dealers, and hence their customers, 95c. per ton more than they expected to pay. To say that the trade is objecting is putting it mildly. All the dealers affected will not accept the arrangement, while others say they are compelled to. The concern referred to is fully cognizant of the position in which it is being placed, but apparently will let nothing interfere with its policy of strictly following the rulings of the Anthracite Committee, regardless of any effect it may have on its future business relations with its trade.

The steam coal market is weak. The fact that Port Reading has been embargoed was quickly reflected here in a heaviness of all steam sizes, including buckwheat. Buckwheat has weakened considerably, with rice even worse, barley unsalable and culm absolutely off the market with no likelihood of its return. The buckwheat situation is reflected in a new order sent out by the fuel administration removing all restrictions on this size. It will be recalled that under date of Jan. 17, 1918, buckwheat had been declared a domestic size and no shipper could ship it to an industrial plant without a special exemption from the administration. Under the recent ruling shippers are now permitted to find a market anywhere for this size.

The prices per gross ton c.o.d. cars at mines for line shipment and f.o.b. Port Richmond for tide are as follows:

	Line	Tide		Line	Tide
Broken	$4.90	$6.25	Buckwheat	$3.40	$4.45
Egg	4.80	6.15	Rice	2.90	3.80
Stove	5.05	6.40	Boiler	2.70	3.70
Nut	5.15	6.50	Barley	2.40	3.30
Pea	3.75	5.00	Culm	1.25	2.15

Bituminous—There continues to be a tendency to a stiffening in the demand for soft coal, but only on account of shortened production. Most of the shortage has been occasioned by the holidays, which the men are inclined to lengthen out even longer than usual. Some operations report strikes due to purely minor differences, such as the cost of furnishing carbide for lamps, which illustrates the tendency of the men to slacken work.

The greatest stringency continues in the best coals, and this week the Pennsylvania Railroad has confiscated a greater quantity than ever of the low volatile coals. In the districts served by the Baltimore & Ohio the car supply has also been somewhat restricted, although in the Pennsylvania districts the average has been somewhat better.

As to price, the general impression now is that the full Government price will prevail until some time in February, for despite any other influences, even mild weather, it is thought the demand up to that time will be sufficient to warrant a continuation of price regulation.

BALTIMORE

Closing days of December see first snow flurries. Soft-coal situation easy, and hard-coal supplies now pour in for trade.

Bituminous—A wee touch of winter has come to Baltimore after a fall and early winter season of exceptional mildness, and the past week saw the first snow flurries. Easy movement of coal-laden cars and a large tonnage production led to heavy deliveries of soft coal to this section. Some few mining districts complained of lack of cars, but the majority of openings were liberally treated. The movement to this section is heavier than the more urgent demand warrants, and some little difficulty was experienced the past week (and is still being experienced) in getting rid of less desirable fuels.

The tendency, in the face of a steady improvement in the grade of coal coming in to this district, is to seek the better classes. There is now no talk of cutting the Government prices, however, and this is accepted as a healthy sign. Many in the trade predict that the specialized coals will sell above the Government maximum as soon as the restrictions of the Fuel Administration are removed.

Anthracite—At last the retail hard-coal trade is seeing a liberal supply released here. The December movement was so satisfactory that the thoughts of famine in the minds of every coal man just before the armistice was signed have vanished. Already some of the more important companies here are asking their customers how much they will take of the one-third undelivered on the books of the coal men. The mild winter may cause some orders to be cut down a bit; and besides, consumers have learned many lessons in economy in burning.

A few of the dealers are still considerably back of their two-thirds delivery, but the inflow of coal is now taking care of all urgent cases. A few dealers are storing a little coal. The month of December will probably have seen a total movement in excess of 75 000 tons of hard coal when the official figures are made up. For the coal year from Apr. 1 to Dec. 1 a total of 435,063 tons was received in Baltimore for domestic and public service corporation use. This leaves nearly 300,000 tons on the city's allotment, to be delivered from Dec. 1. The situation here at present, however, for the first time in months, can be classed as fairly easy.

PITTSBURGH

Holiday curtails production. Contract shipments absorb output. Demand for high-grade gas coal.

Last week coal production in the Pittsburgh district was again quite below normal, on account of the holiday, which was well celebrated. While the market absolutely lacks snap, there being scarcely any buying demand except for special coals, the output is well taken care of by contract shipments and standard grades of coal are held at absolutely full prices. There is considerable demand for high-grade gas coal, particularly from steel works, and it is asserted that if price control were removed gas coal would sell at a substantial premium above steam coal, whatever the steam coal level might be.

Most operators in the Pittsburgh district were in favor of the Fuel Administration retaining control of prices for some time, perhaps to the end of the coal year, and are correspondingly gratified at the recent announcement that the control will continue to Feb. 1, at least.

Industrial consumption of coal has diminished somewhat since the signing of the armistice, but not by a great deal, since the steel industry has been working at practically capacity except for a few closings during Christmas week. It is doubtful whether the steel mills will be working as full 30 days hence, as orders for steel are very light. Domestic consumption has of course been far below normal. Industrial consumers as well as retailers have been drawing upon stock piles and will have little by way of reserves if there is any real winter weather. Requirements of byproduct coke ovens are hardly being met in full. The Pittsburgh district is looking forward to much lighter demands for lake coal next season than was experienced in the past season, when West Virginia's deficit, on account of the special demands of the Navy, had to be made up. The market remains quotable at Government limits, but without any brokerages in addition to regular prices: Slack, $2.10; mine-run, $2.35; screened, $2.60, per net ton at mine, Pittsburgh district.

BUFFALO

Big bituminous surplus. Consumers indifferent to the market. Ohio coal trying to get in. No prospect of further shortage. Prices would go down if not enforced. Anthracite in good supply.

Bituminous—The world seems to be full of coal, and it is hard to get consumers interested in it. The outlook is for a surplus exceeding any in recent years. The fact that there has not been coal enough since the middle of 1916 shows what is taking place everywhere. Bituminous output is larger than it was at any time since the war began, and it will be still larger unless many of the mines close down or run on restricted time.

In Canada coal is piled up, and it is almost impossible to sell any. The amount that has paid demurrage is not only great, but it seems to be increasing. Add to this that the railroad yards are blocked with so much coal that a general embargo is feared, and it is easy to see what has become of the market. Some shippers say that they might find buyers if coal was offered at 50c. off Government prices, and in some instances operators are cutting prices a little.

Jobbers are encouraged, though they are aware that their time has not wholly arrived. The change from scarcity to surplus has been made so quickly that it gave them little chance for business. So far all the jobbers get is a shifting of inquiries from consumer to operator. The consumer wants as little of them now as the operator did formerly.

The one point of firmness is that the Government does not propose to throw off the arbitrary price perhaps till February, when the old contract system promises to return. Quotations remain at $4.65 for thin vein Allegheny Valley, all sizes; $4.45 for Pittsburgh and No. 8 lump, $4.20 for same, slack or mine run; $5.65 for smithing and smokeless, $5.60 to $6.10 for cannel, all per ton f.o.b. Buffalo.

Anthracite—The supply continues to increase. A few days more at this rate and the complaint of shortage will cease. It is reported that everybody has at least some coal, and the people who are receiving a full supply are increasing fast. It seems to be the late increase of supply that has helped the situation, but the closing of the lakes was partly responsible. December is breaking the record for mildness. It is a certainty that not half the fuel has been used that was used during the same month last year.

As it appears now, the middle of February will see more coal offered than is asked for, and some say it will come a month sooner than that. After that the big price is all that will trouble anyone. There is sure to be a turn toward some other fuel if there is any to be found that is acceptable. It is said that quite a good many consumers, especially in Canada, have bought bituminous or cut wood for winter. Some country dealers are already flooded with anthracite that they can neither unload in time nor sell promptly, and a few orders are reported by the shippers to have been canceled.

Reports from the upper lakes are not reassuring, but at this rate the roads can help out more or less. The car supply is good as far as reported by the trade, the only difficulty being that the motive power is inadequate and that unused cars hinder the movement of trains. The fear of famine is past.

CLEVELAND

The turn of the year finds steam coal demand still dwindling, domestic consumers with supplies ample for the remainder of the winter on hand, production off fully 50 per cent., operators more and more tempted to shade Government prices. No. 6 coal at 30 to 60c. under the maximum is being liberally offered.

Bituminous—The only ray of hope in the entire bituminous market is the view of some operators that a fair amount of buying will be done in January by steam-coal users whose operations have not been greatly curtailed by the cessation of war work, and who have not been in the market recently because of a desire to work off war-priced stock piles. This buying will not be large, it is believed, but it will prove most sustaining and provide the only big outlet for No. 8 coal until the lake trade again shows some life, which will be about the middle of March.

Probably at no time this winter has the market been weaker and the outlook so cheerless. Although they did a winter business all summer, retail dealers are complaining bitterly of weather conditions. Supplies put in last summer have been so little eaten into because of the mild weather that little or no buying any more this winter is expected. Financially, some of the smaller dealers have been hard hit. Steam-coal users may be said not to be buying a ton just now. Inventory and holiday time partially account for this, but there is no disguising the fact business conditions have been steadily growing worse. The only ones now consistently holding up are the automobile and automobile parts industries.

Holiday time has cut heavily into production, but this is no cause for concern to operators. What is telling, however, is the constantly increasing proportion of maintenance, something which continues whether mines are worked full time or only half. Mine workers were encouraged to take off as much time as they wished Christmas and New Year, a very dissimilar condition from a year ago. Car supply in the No. 8 district has shown quite a drop, having been only 74.42 per cent. in the week of Dec. 14, compared with 82.16 in the week preceding. Lost production due to car shortage in the week of Dec. 17 was 101,700 tons to members of the Pittsburgh Vein Operators' Association of Ohio, compared with 71,350 tons in the week of Dec. 7.

Any amount of No. 6 coal can be picked up in this market at 30 to 60c. off the maximum. Operators, at least the larger ones, seem to be standing by Government prices on standard No. 8 coal, but the smaller ones are doing some shading. General market conditions, however, render shading a poor stimulant. Some large steam-coal users continue to "nibble" and undoubtedly would place good-sized tonnages were an attractive figure named. These tactics have not yet resulted in any business.

Ending of price fixing Feb. 1 may weaken the position of lake shippers who are figuring on holding out for the 1918 figure. So far as steam and domestic coal is concerned, little change will be felt, it is believed, so long as labor costs remain high. Breaking down of zone barriers will widen the market for No. 8 operators, while it will result in some Pocahontas coming in in competition.

Anthracite—The larger retail dealers continue to receive allotments of five to six cars a week, but domestic demand is distinctly off. Practically all that is coming into Cleveland now is being applied on long-deferred orders.

DETROIT

Slowing of activity in industrial lines, customary at the year end, and an oversupply of bituminous, tend to create a sluggish market in Detroit.

Bituminous—Neither steam nor domestic coal of the bituminous type shows much activity in the local market. Among several influences that are reflected in the market condition one is a diminished demand due to the easing off of industrial activity at the year end, which in the case of many concerns is made more pronounced by the cancellations of Government contracts for munitions and war supplies.

A condition which jobbers pronounce a more important factor in the falling away of business, is the over abundant supply of bituminous now in the reserve piles of steam plants and in the yards of retail dealers. This is the outcome of a sort of frenzied buying that took place a few weeks ago, under stimulus of the reiterated warnings that a serious shortage might be expected this winter.

These disturbing forecasts were circulated just about the time the fuel administration was calling on everyone to buy any coal that could be had, without regard to whether the stock was of a sort suitable to meet the consumer's requirements. Large shipments from Illinois and Indiana were coming into the market at that time, while the movement of West Virginia and Ohio coal was light, because of the priority rules applying to lake loading. The combination of circumstances resulted in numerous steam plants and retail dealers being overstocked with low grade coal, which in the case of some of the retailers is said to be in the form of mine run and other sizes that do not readily find a market with their customers.

Dropping temperatures this week seem to bring a brightening outlook for the retailers, as, providing the frosty weather is continued, there is likely to be a stronger demand from household consumers.

Anthracite—While efforts are being made, it is said, to obtain an increase in the city's allowance of anthracite, shipments continue in small volume. Domestic consumers dependent on base-burner heaters are being urged to put in at once the two additional tons they are allowed to receive to complete their winter supply. It is estimated there are approximately 55,000 of this class of consumers in Detroit. Any residue of anthracite remaining after they are supplied will be available to hot-air furnace users to the extent of one-half their fuel needs for the winter.

COLUMBUS

Colder weather has stimulated the retail trade to a small extent, although the full benefits have not yet developed. Steam trade is still quiet. Production is not large.

A cold wave that appeared just previous to Christmas has had the effect of stimulating the retail trade, which has been rather quiet for the past month or six weeks. Retailers have started deliveries on orders caused by the lower temperatures, and there is quite an increase in the volume of business. Retail stocks are good and the cold spell is not yet reflected on the operating and jobbing ends of the industry. Consumers are buying the fancy grades principally, as Pocahontas is now in the market. Frequent calls are also received for Ohio-mined coals. Retail prices have been shaded slightly under the influence of slow business, but many of the larger dealers are holding to the Government levels. Rural dealers are having a good trade, as farming communities did not stock as early and as liberally as urban sections.

The steam trade is quiet and probably will remain in that state for some time. Consumers are heavily stocked and are loath to buy under present conditions. Manufacturing plants are casting around to get on a peace basis, but the transition will take some time. Railroads are taking a fair tonnage, and that is the best feature of the steam trade. War plants are gradually cutting down, and their fuel requisitions are not so large as formerly. Most of the steam producers are playing a waiting game, being content to abide their time instead of trying to force trade by cutting quotations. It is realized that there is little demand and coal can not be sold to any extent by cutting prices. Some of the smaller producers, and especially those from West Virginia, are shading prices, but the effect is not felt in the trade generally.

Production is rather slow, due largely to lack of orders. Influenza is still having its effect on the output. But there is no special reason to increase the production and operators are generally loading when they have orders to fill. Cancellations, which were frequent several weeks ago, have now practically stopped and many cancelled orders are being replaced on the books. This indicates a better selling. In the Hocking Valley the output has been about 65 per cent. and in the Pomeroy Bend field about the same. In eastern Ohio the output has been slightly above 50 per cent.

CINCINNATI

Mild weather dominates the trade, demand being limited in all departments of the market. Prospects for colder weather are welcomed.

The coal trade is still under the influence of a remarkably mild season, coupled with the fact that most people, including both domestic consumers and industrial users of fuel, have enough coal to run them for a time. The most remarkably warm winter in several years has been experienced thus far, and several prospects for colder and more severe weather have passed by without making good. The consumption of fuel has accordingly been on a limited scale, so far as heating purposes are concerned, while the industrial situation also remains such as to make consumption very small, compared with a normal season.

The sudden let-up in manufacturing caused by the end of the war has not as yet given way to activity, and is not expected to do so until after the first of the year, if not a good deal later; in the meantime the business resulting from demands for immediate delivery is extremely small. Predictions of much colder weather in the near future must be realized before the coal trade will have anything much in the way of business, and the Christmas holiday, with its reduction in production, is therefore actually welcomed, instead of coming as a serious factor in limiting the available amount of fuel, as the case usually is, and was emphatically last year. Should severe weather come and last for a time, enough emergency demand is expected to stimulate business somewhat, although it is realized that really active business depends chiefly upon the industrial situation.

LOUISVILLE

Colder weather along with reduced production great aid to general market. Prices firmer, and market in generally better shape. Domestic coal showing some improvement, with almost all grades of steam draggy.

The first snow of the season struck Louisville on Christmas Day, and the retail business is showing some slight improvement as a result. However, cold weather is needed to clean up surplus stocks, and get the consumers back into the market. Consumers at the present time are so well protected that orders for the most part are for small quantities. Jobbers report a slightly better volume of inquiries, but not so much actual business. Reports of lower prices are leading to more inquiries than actual business, but the market is looking up.

With the producers the situation is somewhat easier as a result of the layoff for the Christmas holidays. Some mines are down entirely, while others are operating only 40 per cent., still others making no effort whatever to operate more than two or three days. Cars are plentiful and labor is in full supply. A number of producers are reported to be cutting prices slightly in order to secure business and are absorbing brokerage. Wagon mines and small mines without marketing facilities are reported to have cut prices as much as 50c. a ton and more, but are slowly being forced out of competition by lack of demand and the fact that tipple mines have an overproduction.

Rail coal shippers are somewhat worried over the prospects for a revival of river coal movement. Due to the fact that the pressure on West Virginia and Pittsburgh field operations has let up somewhat, it is reported that consumers in these districts are again looking up their river markets, and are planning to start shipping by water on high tides. Due to the fact that rail rates have been increased 25 per cent. by the Federal Director, and that water rates show only a small increase in operating expenses, of less than 10c. a ton when handled by big towboats, it is believed that river coal will be a big factor in the Ohio and Lower Mississippi river markets. There is a shortage of coal-carrying equipment on the Ohio which may hold back movement somewhat this season, but it is believed that with advantage in freight rates coal by river will come back strong.

General complaint is again heard concerning collections. Retailers have been having a little trouble in collecting, while the mine operators have been so anxious for business that some of them have again started shipping rather freely on open account. One large mine operator said he was voicing the opinion of a number of operators when he said "Collections are rotten."

Coke

CONNELLSVILLE

Coke control probably continues. Continued scarcity. Blast furnaces somewhat less active.

While at this writing there has been no formal announcement by the Fuel Administration as to how long it intends to continue control of coke prices, the trade in general is disposed to conclude that the Fuel Administration's policy will be the same with respect to coke as with respect to bituminous coal, so that the announcement that price control on coal will continue at least to Feb. 1 is to be taken as indicating that coke price control will also continue. If the coke operators have any feeling on this subject it is one of disappointment, as they were in hopes of some fancy prices ruling for a while if price control were taken off Dec. 31. The blast furnaces, on the other hand, are very much pleased, even those that have contracts, as they anticipated difficulty in securing contract deliveries if price control were taken off, asserting that coke operators have often yielded to the temptation to sell in the open market coke that was due on contract.

The blast furnaces are not running altogether as well as they were. While very few have actually blown out, quite a number are operating at slightly reduced rates. There is no new demand for pig iron and shipments are made up of such iron as buyers are willing to take on contract. Many buyers are seeking cancellation of contracts, but the furnaces assert that they expect all contracts to be carried out.

There is practically no furnace coke being offered in the open market, but there are fair offerings of foundry coke, and demand is lighter than it was. The market remains quotable at Government limits: Furnace, $6; foundry, 72-hour selected, $7; crushed, over ¾-in., $7.30; clean screenings, over ½-in., $5.50, per net ton at ovens.

The "Courier" reports coke production in the Connellsville and Lower Connellsville region in the week ended Dec. 21 at 288,505 tons, an increase of 4540 tons, and raw coal shipments at 206,400 tons, a decrease of 7500 tons.

Buffalo—The supply is improving, as coal is more plentiful. The situation, however, is not easy yet, and it is not likely to be immediately, due to the scarcity of help in the beehive districts. The output is increasing, though, and it will likely continue to increase. Furnaces are expected to be active, no matter if they have no war orders to fill. Hardware is so scarce here that it is difficult to buy nails or anything of the sort, and this shortage must be made up somehow. Fuel breeze coke is not finding a very ready market and the same will soon be the case with the sizes.

Middle Western

GENERAL REVIEW

No market of any kind. Industries well stocked with coal and only curtailment of production will help the coal industry to steady itself and prepare for the future.

We are practically at the beginning of the new year, and no relief, of any substantial nature, is in sight for the coal operator. The demand for coal on all sizes, either steam or domestic, is gone. The market, if it may be called such, has degenerated into purely a "weather proposition," and nothing short of a blizzard will help.

The writer recently made a trip which covered the manufacturing centers of Illinois, Indiana and Michigan. It was found that all the large steam plants had enough coal on hand to enable them to run from six to ten weeks. It is safe to say that all factories in the territory mentioned above acted on the advice of the Fuel Administration, and are in a position to run full time. It is true that there are isolated cases where there is little coal in storage, but it is also true that there are plants with enough storage coal on hand today to enable them to run steadily until the first of April.

The domestic situation, in a modified way, is about the same. Take the city of Grand Rapids, Michigan, for an example. It is estimated that there is approximately 65,000 tons of domestic coal consumed in Grand Rapids every winter. The local Fuel Administration say they have figures to show that the retail dealers have in their bins today approximately 50,000 tons of coal. The retailers say that they have little chance of selling this coal, as they stocked up their trade during the summer and fall months. From this it can be readily seen that the retailers of Grand Rapids will not purchase coal very heavily during the coming winter. A careful investigation further shows that what is true about the domestic coal situation in Grand Rapids is equally true of nearly all the towns in the Mid-West territory. It may be that some retail dealers are purchasing heavily at this time, but these cases are rare enough to be the exception that proves the rule. There is one oft repeated factor that will no doubt help matters, and that is the average householder has his bins filled with Illinois or Indiana coal, which burns much faster and with less resulting heat than the higher grades of eastern coal.

There is no doubt about the fact that what ails the coal industry today is overproduction. The factors which brought about this condition are too well known to go into at this time. It is pretty generally conceded by the operators that there is only one cure for the trouble at present hindering the industry, and that cure is a decrease in production either to be brought about by the operators themselves, or through action on the part of the Fuel Administration. At all events, it will be a beneficial thing if some strong influence is brought to bear in order to steady conditions in the industry until such time as the reconstruction program is well under way, when it will be possible for the industry to look into the future and prepare itself for further developments.

CHICAGO

News that eastern coal is to be kept out of local market pleased dealers. Anthracite situation puzzling. Many dealers have plenty of hard coal, while others have none. Little anthracite being delivered to consumers.

The news that the present zones were not to be abolished for some time came to the Illinois and Indiana operators, as well as the retail dealers of Chicago, a few days ago, and brought with it a decided feeling of relief.

The operators were pleased by the information, because they were assured that Chicago, one of the few remaining localities where coal is sold, would continue to be open to them. The dealers were pleased because they now have an opportunity to dispose of their surplus stock of Illinois and Indiana coal. If eastern coal had been allowed on the market, it is very probable that serious difficulties would be encountered in disposing of the Indiana and Illinois coals to the public. It is only fair to state, however, that it is a debatable question if eastern coal ever wins back its old position in Chicago. Many people and firms who heretofore would use only eastern coal, and who, through various conditions have been forced to burn Illinois and Indiana products, like these coals so well that the eastern fuels will probably never displace them.

The anthracite situation continues to be an affair of many angles—so many that few people understand it, even the local Fuel Administration. It appears that some dealers have plenty of it in their bins, while others have none. It doesn't make much difference, however, because those with it are bound by so many rules, restrictions, regulations and other things, dear to the heart of the local Fuel Administration, that there is no opportunity for them to move it from their bins.

MILWAUKEE

Colder weather and snow promise to liven up a dejected market. Anthracite and coke prices reduced by the fuel administration, owing to a shading of dock charges.

The coal market ruled unusually quiet all through the month of December, because of the mildness of the weather, but Christmas week brought snow and a blizzard, which, if it continues, will inject "pep" into the situation. The last run of anthracite cargoes has been unloaded, but there are still some cargoes of soft coal afloat. Receipts of anthracite by rail continue to a moderate extent.

Following closely after the raise of 90c. per ton on all grades of anthracite except

buckwheat, noted last week, came an edict from the same source making a reduction in the retail price of anthracite of 25c. per ton and cutting coke 50c. per ton. The drop in the price of anthracite was due to the fact that dock companies have been restricted to a charge of 50c. per ton for loading wagons and trucks. Formerly they were allowed 75c. Wagon dealers are accorded a margin of profit of $1.75, and wholesalers $2.25. The new ruling put the large and small dealer on the same footing in regard to retail prices. Anthracite delivered at the curb is now worth $12.52 for nut, $12.21 for egg, $12.43 for stove and $11.05 for pea. The maximum price that can be charged for carrying in coal is 50c. per ton. Coke is now $11.50 carried into bins, as against the former price of $12.

ST. LOUIS

A dragging market continues. Weather conditions bring better prospects. No domestic or steam demand to speak of. Car supply good, transportation getting slow. General situation seems to be slightly improved, with prospects fairly good.

The local market is still heavy and slow. The cold weather that started on the 24th helped a little, and business always is slow during the holidays. The light snow that followed on the 26th and 27th was the first of the season, and it was not of a nature that helped the situation at all.

Domestic demand is poor. As a matter of fact, there is scarcely any domestic coal moving except into the poorer sections of the city, the residents of which usually live from hand to mouth.

Steam business at the last part of the year is always slow, firms preferring not to spend any more money than they have to at the close of the year and usually depending upon their storage supply to get through the last week or ten days. That, of course, has held the movement up, but everything indicates a better tone to the market in the near future and operators and retailers are looking forward to some splendid business periods during January and February, and possibly into March. The railroads have not bought as heavily recently as they were expected to, and they will likely soon come in for a good tonnage.

In the Standard field the situation is still in bad shape. Some mines have been down entirely for as long as a week at a time, and others are running on one and two days a week. Screenings are exceptionally hard to move, and some companies have as many as 100 cars of screenings unbilled, being able to move lump in a pinch. However, other mines have a surplus of lump sizes on hand, and there does not seem to be any systematic method of equalizing the distribution of the different sizes from the field as a whole. If it were permissible, and the authority were delegated to some association or individual capable of keeping clean and free from entanglements, a pool of the Standard field would be the only method whereby any efficiency would enter into the distribution plan at all. Some operators sell all lump and no screenings, and others sell all screenings and no lump, as a result all the mines are idle and a lot of coal is given away below cost for the lack of a proper selling or distributing agency.

There is some dissatisfaction at different places in the Standard field among the men from lack of work, etc., but it is expected to gradually disappear with a better demand.

The railroad tonnage from the Standard field is fairly good, but not what the operators would like or what they expect. It is good enough, however, to keep several mines going on fairly decent working time.

In the Mt. Olive field conditions are much better than those in the Standard field. The demand for this coal, which is of higher grade, is better throughout the north and west, and a heavy tonnage seems to be going to Chicago. Working time is good, and the railroad tonnage from this section is also heavy, so that in a general way the Mt. Olive field presents a somewhat satisfactory situation.

In the Carterville field in Williamson and Franklin Counties, and also in the Duquoin field, the conditions have improved in the last few days. While there is a surplus of coal in these fields, orders seem to have come in for shipment to the north in better volume. In a general way the situation has improved. Cars are somewhat short in some places and transportation is not all that it could be, even in the few days prior to the recent snow; but taken as a whole, the situation in these fields is entirely satisfactory. There seems to be no trouble anywhere, and while some mines are not getting all the working time they want, a general feeling of satisfaction ushers in the New Year in these districts. The railroad tonnage from these fields is also heavy and has helped to maintain the market conditions.

In the St. Louis market Standard 2-in. lump is still selling anywhere from $1.50 to $1.80, with Standard egg and nut at about the same price. Mt. Olive is as low as $1.65, and 6-in. lump from $1.75 to $2.00, with screenings at from $1.20 to $1.50.

There has been no cut in the Mt. Olive prices to speak of, and only here and there has anything been done in the way of cutting Carterville prices; and that was usually on restricted equipment or on off-grade coal.

There is no change in the domestic prices in St. Louis and at the close of the year they are as follows:

Carterville lump	$5.75
Mt. Olive lump	5.25
Standard lump	5.00

The Government price per net ton f.o.b. mines, with the exceptions above noted is:

	Williamson and Franklin County	Mt. Olive and Staunton	Standard
6-in. lump	$2.55@2.75	$2.55@2.75	$2.40@2.70
3x6-in. egg	2.55@2.75	2.55@2.75	2.40@2.70
2x3-in. nut	2.55@2.75	2.55@2.75	2.40@2.70
Washed:			
No. 1	3.05@3.20	3.05@3.20	.....
No. 2	3.05@3.20	3.05@3.20	.....
No. 3	3.05@3.20	3.05@3.20	
Mine Run	2.35@2.50	2.35@2.50	2.20@2.30
Screenings	2.17@2.32	2.17@1.32	1.50@1.60

Special preparation on Carterville is 10 cents extra. Williamson & Franklin Co. rate is $1.10. Other fields 95 cents.

General Statistics

Directors of the Pond Creek Coal Co. have declared a dividend for the quarter of 37½c. a share, payable Jan. 1 to stock of record Dec. 27. Since July 2, 1917, Pond Creek has been paying 50c. each quarter, so that the present declaration is equivalent to a cut from a $2 to $1.50 annual basis.

LOADINGS OF BUNKER COAL DURING OCTOBER, 1918

Bunker coal laden on vessels engaged in the foreign trade, according to the Bureau of Foreign and Domestic Commerce, is as follows for each of the customs districts specified:

Districts	Gross Tons
Maryland	31,713
New York	231,894
Philadelphia	21,661
Virginia	64,473
Total	349,741

BALTIMORE & OHIO

Following is a statement of coal and coke tonnage moved over the Baltimore & Ohio system and affiliated lines during the month of August, 1918, as compared with the corresponding month of the previous year:

	1918, Tons	1917, Tons
Coal	4,658,226	3,165,568
Coke	219,126	295,917
Total	4,877,352	3,461,485

Exports of Anthracite and Bituminous Coal and Coke, by Customs Districts and Countries, During October, 1918

(Compiled by Bureau of Foreign and Domestic Commerce)

From Customs District	To	Anthracite, Tons	Bituminous, Tons	Coke, Tons
Maine and New Hampshire	Canada	66	19	138
Vermont	Canada	1,570	12,391	326
Massachusetts	Canada	37	.....	.....
Massachusetts	Newfoundland	6	.....	.....
St. Lawrence	Canada	132,136	218,569	2,906
Rochester	Canada	82,427	90,049	338
Buffalo	Canada	224,399	289,894	52,928
New York	Canada	11,565	.....	.....
New York	Dutch West Indies	.....	1,020	.....
New York	San Domingo	.....	15	.....
New York	Bermuda	.....	.....	100
New York	Guatemala	.....	.....	2
New York	Danish West Indies	.....	.....	2
New York	Argentina	.....	.....	94
New York	Venezuela	.....	.....	5
Philadelphia	Cuba	1,957	.....	.....
Philadelphia	Danish West Indies	.....	426	.....
Philadelphia	Brazil	.....	409	.....
Maryland	Cuba	.....	5,103	.....
Maryland	Brazil	.....	2,615	.....
Maryland	Peru	.....	.....	1,584
Virginia	Bermuda	.....	538	.....
Virginia	Panama	.....	17,605	.....
Virginia	Mexico	.....	1,659	.....
Virginia	Other British West Indies	.....	3,960	.....
Virginia	Cuba	.....	79,489	69
Virginia	Danish West Indies	.....	1,985	.....
Virginia	Dutch West Indies	.....	2,138	.....
Virginia	French West Indies	.....	1,170	.....
Virginia	San Domingo	.....	1,340	.....
Virginia	Brazil	.....	35,437	.....
Virginia	Chile	.....	22,419	.....
Virginia	Uruguay	.....	10,121	.....
South Carolina	Cuba	.....	2,500	.....
South Carolina	Uruguay	.....	3,711	.....
Georgia	Cuba	.....	1,450	.....
Florida	Cuba	.....	1,099	.....
Mobile	Cuba	.....	300	.....
New Orleans	British Honduras	.....	1	2
New Orleans	Guatemala	.....	51	.....
New Orleans	Honduras	.....	240	.....
New Orleans	Nicaragua	.....	251	.....
New Orleans	Chile	.....	7,500	.....
New Orleans	Mexico	.....	.....	47
Sabine	Mexico	5	.....	.....
San Antonio	Mexico	197	592	5,819
El Paso	Mexico	210	4,714	3,729
Arizona	Mexico	.....	12,215	9,872
Southern California	Mexico	3	6	.....
San Francisco	Salvador	1	.....	5
Washington	Canada	.....	280	154
Washington	Chile	.....	6,483	.....
Alaska	Canada	.....	3	.....
Montana and Idaho	Canada	.....	42	.....
Dakota	Canada	.....	1,115	58
Duluth and Superior	Canada	.....	1,348	48
Michigan	Canada	1,351	105,593	19,248
Ohio	Canada	8	940,926	21,323
Total		456,029	1,888,801	118,796